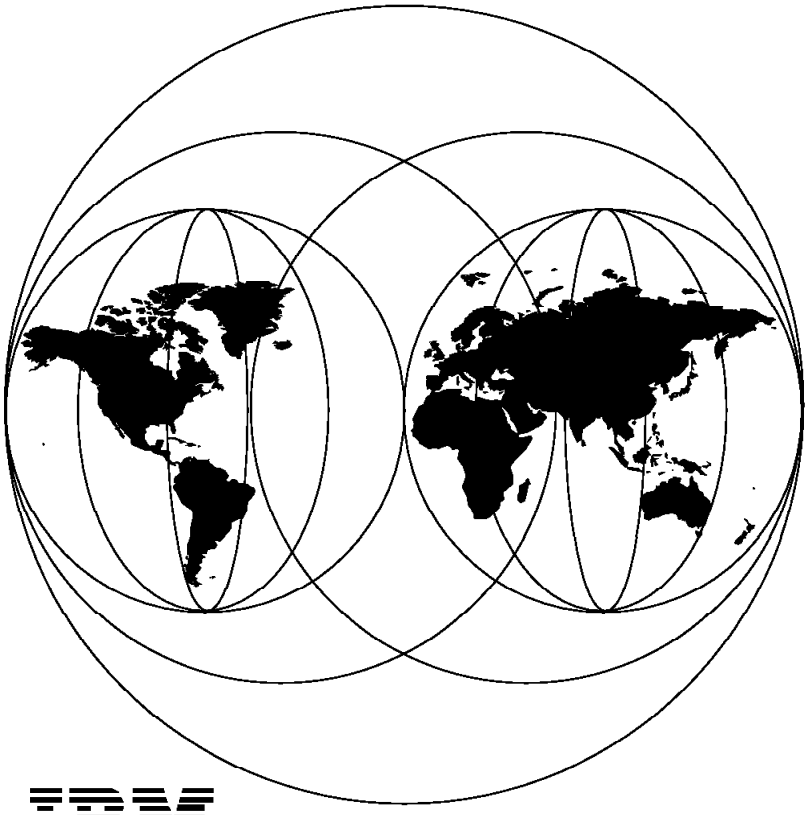
SG24-4818-00

LANRES/VSE: Integrating OS/2 LANs into S/390 VSE Systems

May 1997



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Take Note!

Before using this information and the product it supports, be sure to read the general information in Appendix D, “Special Notices” on page 131.

First Edition (May 1997)

This edition applies to Version 6, Release 1.1 of LAN Resource Extension and Services/VSE (LANRES/VSE), which is part of VSE/Central Functions, Program Number 5686-066, for use with the VSE/ESA Version 2, Release 2 Operating System.

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Preface

With LAN Resource Extension and Services/VSE (LANRES/VSE) that is included in VSE/ESA Version 2.2, you can fully integrate OS/2 and Novell NetWare LANs into your VSE environment.

This redbook shows how to implement the cooperation between OS/2 LAN servers and VSE/ESA systems using LANRES/VSE. This concept extends the LAN user′s ability to exploit resources and services on the VSE/ESA host system through the LANRES functions such as data distribution and LAN administration, disk serving and printing services.

We describe in detail all the steps that are required to install and set up LANRES/VSE on the VSE/ESA system as well as on the OS/2 servers. Several practical examples are presented to show how the LANRES/VSE functions and facilities can be used in a VSE/ESA and OS/2 LAN environment.

This book does not contain information about Novell NetWare LANs as this is documented in a separate redbook ″LANRES/VSE: Integrating Novell LANs into S/390 VSE Systems″, SG24-4561.

This publication is intended for system engineers or programmers responsible for the integration of LAN-connected workstations using a VSE/ESA host system as central disk, print and administration server.

The reader is assumed to have a working knowledge of VSE/ESA, OS/2 Warp and the corresponding LAN server software. In addition, he should have a basic understanding of IBM′s major communication protocol, SNA/VTAM.

The Team that Wrote this Redbook

This redbook was produced by a team of specialists from around the world working at the International Technical Support Organization Böblingen Center.

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Thanks to the following person for the advice and guidance provided in the production of this document:

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Part 1. Introduction

This document describes how to use LANRES/VSE for accessing VSE/ESA applications and data from OS/2 servers and OS/2 LAN clients.

This part provides a brief introduction of general LANRES/VSE concepts.

Chapter 1. LANRES/VSE Overview

1.1 LANRES/VSE Concepts

LANRES (LAN Resource Extension and Services) from IBM is an enterprise-wide application for the integration and management of OS/2 or Novell NetWare LANs. LANRES/VSE connects OS/2 or Novell NetWare LANs with VSE/ESA running on IBM System/390 processors.

In this book, we will focus on LANRES/VSE for OS/2. For information about Novell NetWare support, please refer to the redbook *LANRES/VSE: Integrating Novell LANs into S/390 VSE System, SG24-4561*.

LANRES/VSE (OS/2 support) is based on the client/server computing model and provides the following functions:

1. **Disk Serving**

   The LANRES Disk Serving function expands the storage resources of the OS/2 server by making host DASDs transparently available to OS/2 LAN clients. The host DASDs can be configured to be used by the OS/2 server and OS/2 LAN clients.

   From an OS/2 LAN point of view host files residing on these DASDs are treated as separate server disks, that is the disk storage of the OS/2 server is expanded. From the host's operating system point of view these disks appear as regular files, for example VSAM RRDSs in the case of VSE/ESA. This means that these OS/2 server disks can be distributed throughout the System/390 environment and they can be backed up in the same way as other host data.

2. **Distribution and Administration**

   LANRES Distribution and Administration commands provide a means to effectively manage the data on your OS/2 servers from a central location, the host. This includes files which may physically reside on the host as a result of the LANRES disk serving function.

   A software Distribution and Administration initiated from the host allows to view data stored on OS/2 servers from one central location. It also provides host access to workstation data at the file level. Files residing on the server can be retrieved and copied on the host. On the other hand, Distribution and Administration can also be used to distribute files which currently reside on the host to the OS/2 server. Translation between host and workstation data (EBCDIC to ASCII and vice versa) is controlled by LANRES.

   LANRES Distribution and Administration also provides the ability to perform OS/2 administration activities such as adding and deleting user IDs, changing passwords or restricting account authority.

   With the LANRES Distribution and Administration function, you can execute OS/2 commands on the OS/2 server from your VSE/ESA system with the possibility to receive and display the command output on the host system.

   The LANRES Distribution and Administration functions are initiated from the host and can be combined in batch mode to automate the administrator's activities.

3. **Printing Services**

   a. **Host-to-LAN Printing**

      LANRES Host-to-LAN Printing lets IBM S/390 users print files on LAN printers. Data can be translated from EBCDIC to ASCII. No OS/2 user ID is required to print your files.

   b. **LAN-to-Host Printing**

      The LANRES LAN-to-Host Printing function gives OS/2 users access to host printers. While OS/2 users send their data to regular OS/2 print queues, special LANRES-provided applications are used to monitor these queues and send the data to the host for printing.

The LANRES products have three components:

1. The Host (IBM System/390) running VSE/ESA

   Each of the LANRES functions runs as an independent process on the host.

2. The OS/2 Server

   The LANRES server code consists of several applications which can be easily installed from diskette onto the OS/2 server. The LANRES applications are started independently and only those applications planned to be used have to be started.

3. A Communication Path between the Host and the OS/2 Server

   There are different ways to connect the host and the OS/2 server:

   - A direct S/390 channel connection (parallel or ESCON channel)
   - SNA LU 6.2 using APPC
   - P/390 using an internal communication

1.2 LANRES/VSE Connectivity

LANRES/VSE is another member of the LANRES family of products which allows OS/2 LAN clients to access VSE/ESA resources and provides central management functions for OS/2 LANs from VSE/ESA hosts.

It runs on any System/390 processor capable of running VSE/ESA and supports the LANRES functions listed in 1.1, “LANRES/VSE Concepts” on page 3.

There are three basic options to connect VSE/ESA and the OS/2 server to each other:

1. Channel connection

   This is a fast link between the host and the OS/2 server which uses a direct communication provided by VSE/ESA and LANRES/VSE on the host side and OS/2 and LANRES/VSE on the LAN server side.
   To implement this solution there are two possibilities:

   - via IBM 3172 as the LAN server, where the OS/2 server runs, which can be attached to the host via a parallel or ESCON channel and to the server via a Token-Ring or Ethernet adapter
   - via MicroChannel to Mainframe Connection (MMC), where you have a Channel adapter card in the server and a parallel channel in the host

2. Using a LAN or an SDLC connection.

Here VSE/ESA and the OS/2 server are connected either via a LAN (IBM Token-Ring LAN or Ethernet LAN) or an SDLC line. Only SNA LU 6.2 communication is supported with this connection. We will refer to this as an APPC connection in this book.

3. Using a P/390 connection

   In this case you can communicate from the OS/2 side to the S/390 side of the PC Server System/390 machine using an internal communication, that emulates a channel connection.

1.3 The ITSO Böblingen LANRES/VSE Client/Server Environment

Figure 1 on page 6 illustrates the ITSO Böblingen LANRES/VSE environment which consists of:

1. LANRES/VSE running on a VSE/ESA V2.2 machine under VM/ESA R2.1 on an IBM 9221 host.
2. OS/2 Warp running OS/2 Warp Server on a PS/2 Model 90, which is accessed by the following OS/2 clients:
   - DOS (DOS V7.0)
   - Windows (Windows V3.1)
   - OS/2 (OS/2 V3.0)
3. Two physical connections between LANRES/VSE and the OS/2 server:
   - MicroChannel to Mainframe Connection
   - IBM Token-Ring LAN

More details regarding our environment are provided in Part 2, “Implementing a LANRES/VSE - OS/2 LAN Client/Server Environment” on page 7.

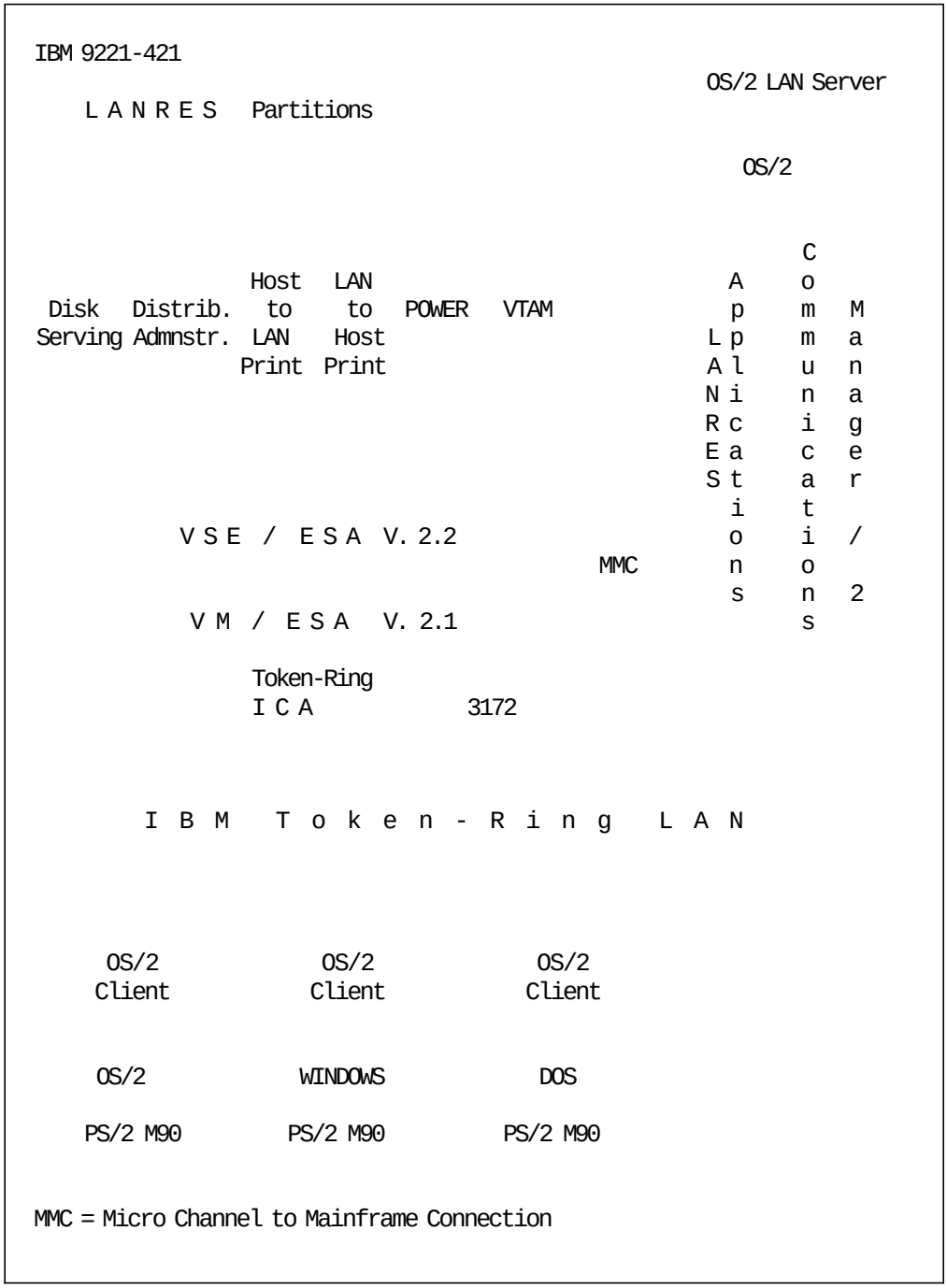

Figure 1. The ITSO Böblingen LANRES/VSE Client/Server Environment

Part 2. Implementing a LANRES/VSE - OS/2 LAN Client/Server Environment

This part describes how to implement a LANRES/VSE - OS/2 LAN client/server environment.

Chapter 2. Implementation Overview

Detailed information about how to install and set up both the VSE/ESA and OS/2 LAN part of the environment is provided in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624*.

This book provides, therefore, only additional hints and tips which are based on our actual experience during the implementation of the environment shown in Figure 1 on page 6.

Corresponding to its three components described in 1.1, “LANRES/VSE Concepts” on page 3, the implementation of a LANRES/VSE - OS/2 server/client environment involves three main tasks:

1. Installation and setup of LANRES/VSE on VSE/ESA
2. Installation and setup of LANRES/VSE on the OS/2 server
3. Setting up communications between LANRES/VSE and the OS/2 server

Each of these tasks consists, in turn, of several steps which are explained in the subsequent chapters.

Before we go into the details of the implementation, let’s briefly review the hardware and software requirements of LANRES/VSE.

2.1 Hardware and Software Requirements

More detailed information on hardware and software requirements is available in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624* and the corresponding product information, see Appendix E, “Related Publications” on page 133.

2.1.1 Hardware Requirements

LANRES/VSE has the following hardware requirements:

1. On the Host

   An IBM processor supported by VSE/ESA Version 2 with either a 9-track/6250 bpi magnetic tape drive or an 18-track/38K 3480 cartridge tape drive.

2. On the OS/2 server

   One of the following to run the OS/2 server operating system:

   - An IBM PS/2 system capable of running OS/2 Version 3.0 or later
   - IBM PS/55
   - An IBM 3172 Interconnect Controller Model 3 if a fiber-optic connection is to be used
   - PC Server System/390

3. For the Communication Path

   Depending on the type of communications chosen, one of the following:

   - For the **Fiber-Optic Channel Connection**, a host which supports the ESCON architecture and the IBM 3172 Interconnect Controller for the OS/2 server.

- For the **Parallel Channel Connection**
  - an IBM PS/2 MicroChannel to Mainframe Connection(MMC) or
  - the S/370 Parallel Channel Adapter Feature if the IBM 3172 Interconnect Controller is used for the OS/2 server.
- For the **OS/2 server Channel Connection**, three physical connections are possible:
  - an IBM PS/2 MicroChannel to Mainframe Connection or
  - the S/370 Parallel Channel Adapter Feature of the IBM 3172 Interconnect Controller or
  - the ESCON Adapter of the IBM 3172 Interconnect Controller.
- For the **SNA LU 6.2 Connection** both host and OS/2 server need to connect to a medium which supports this type of communication, for example:
  - an IBM Token-Ring LAN
  - an Ethernet LAN
  - an SDLC line.

2.1.2 Software Requirements

LANRES/VSE has the following software requirements:

1. On the Host

   The host requires VSE/ESA Version 2.2 or later. LANRES/VSE is a new feature of the VSE/ESA Operating System and comes on a VSE/ESA optional program stacked tape (Version 2 format).

2. On the OS/2 server

   One of the following operating systems:

   - OS/2 Version 3.0
   - OS/2 Version 4.0
   - OS/2 Warp Server 4.0 (to be able to support LAN clients)

3. For the Communication Path

   Depending on the type of communications chosen, software requirements vary as explained below.

   - For the **ESCON and Parallel Channel Connections no additional communication software** is required. The communication for this type of connection is handled by low level code on the VSE/ESA side and by LANRES/VSE on the OS/2 side
   - The **SNA LU 6.2 Connections** require:
     - ACF/VTAM V4.2 or later on the host and
     - Communications Manager/2 or Communications Server/2 on the OS/2 server.

Important Note

There are several options to connect the LANRES/VSE on the host and the LANRES on the OS/2 server. In our test environment we implemented three types of connection:

1. MicroChannel to Mainframe Connection
2. IBM Token-Ring LAN using the IBM 3172 Interconnect Controller
3. IBM Token-Ring LAN using the Token-Ring Integrated Communication Adapter

In your installation, you will implement one of them (or perhaps one not specified here). You do not have to implement all of them.

In this book we give the instructions for the three types of connection. However, you only need the definitions related to the connection that you choose. For example, in Figure 9 on page 19 we show the definitions for the IPL. If you are going to use the connection with the IBM 3172 APPC/LAN, you do not have to specify the definitions for the MicroChannel to Mainframe Connection and Token-Ring Integrated Communication Adapter.

Chapter 3. Installing and Setting Up LANRES/VSE on VSE/ESA

To prepare the VSE/ESA host for LANRES and communication to the OS/2 server, you need to perform two major tasks:

1. Prepare for and install LANRES/VSE
2. Set up the host for communications to the OS/2 server

Let us now look at both tasks in more detail.

3.1 LANRES/VSE Installation

The hardware and software requirements of LANRES/VSE are described in Chapter 2, “Implementation Overview” on page 9, also refer to *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624* chapter 3.

According to our environment, shown in 1.3, “The ITSO Böblingen LANRES/VSE Client/Server Environment” on page 5, to connect LANRES/VSE on the host with LANRES/VSE on the OS/2 server we made three types of connections:

1. MicroChannel to Mainframe Connection
2. IBM 3172 Interconnect Controller
3. Token-Ring Integrated Communication Adapter

Installing LANRES/VSE in a VM/VSE environment involves the following four steps:

1. Customize the IOCDS
2. Update the VM/ESA directory of the VSE guest machine
3. Install LANRES/VSE on VSE/ESA
4. Customize VSE/ESA IPL and JCL procedures

3.1.1 Customize the IOCDS

These connections were defined in the IOCDS of our IBM 9221.

3.1.1.1 MicroChannel to Mainframe Connection IOCDS

Figure 2 shows the IOCDS definitions we made for the MicroChannel to Mainframe Connection.

```
CHPID    PATH=(22),TYPE=BL
CNTLUNIT CUNUMBR=(2240),PATH=(22),SHARED=N,UNITADD=((40,16)),          C
               PROTOCL=S4,UNIT=3088
IODEVICE ADDRESS=(2240,16),CUNUMBR=(2240),UNITADD=40,UNIT=3088
```

Figure 2. IOCDS Definitions for the MicroChannel to Mainframe Connection

Note that the MicroChannel to Mainframe Connection adapter of the OS/2 server is defined as a native CTCA (Channel to Channel Adapter) to the host processor. We specified 16 subchannels that can be used for the LANRES/VSE applications; you can adjust this value according to your requirements. As described in more detail in 4.2.1, “MicroChannel to Mainframe Connection” on page 36, **two**

subchannels (or one subchannel pair) are required for each LANRES/VSE application (Disk Serving, Distribution and Administration, Host-to-LAN Printing and LAN-to-Host Printing).

3.1.1.2 IBM 3172 Interconnect Controller IOCDS

The following IOCDS definition was for the IBM 3172. It was used to attach the IBM Token-Ring LAN to our IBM 9221.

```
CHPID    PATH=(29),TYPE=BL
CNTLUNIT CUNUMBR=(3172),PATH=(29),SHARED=N,UNITADD=((60,32)),          C
               PROTOCL=S4,UNIT=3172
IODEVICE ADDRESS=(2960,32),CUNUMBR=(3172),UNITADD=60,UNIT=3172
```

Figure 3. IOCDS Definitions for the IBM 3172

For our APPC over Token-Ring connection **one subchannel** of the IBM 3172 is required.

Before the IBM 3172 Interconnect Controller can be attached and used, its ICP (Interconnect Control Program) has to be set up accordingly. Figure 4 on page 15 shows the ICP of our IBM 3172.

```
3172-3 Configuration Summary

 3172 Name ................... : IS23172
 3172 Type ................... : 3172-3 LAN Gateway
 Int Enhancement Feature (IEF) : Yes
 User Data ................... : LAN Gateway for 9221-150(IS2)
 Location .................... : Building 02 Room 018

 ICP Base Code Version........ : 3.02.00
 ICP IEF Code Version......... : 3.02.00
 APARs/Patches applied........ : None

 Profile Name ................ : TRL3172

 Slot    Name        Adapter Type
 ----    ----------  ----------------------
  1      Unassigned
  2      Unassigned
  3      Unassigned
  4      CHAN29      Parallel Channel
  5      Reserved
  6      Unassigned
  7      TOK1        Token-Ring 16/4
  8      Fixed Disk

 LAN Function Name ........... : SNAGATE
 Channel Adapter Name ........ : CHAN29

                To        To       LAN     Block  Maximum
Subchannels  Channel     LAN    Adapter   Delay  Response
-----------  --------  -------- --------  -----  --------
   60        TOCHN060  TOLAN060 TOK1       10      100

 Slot ........................ : 4
 Adapter Name ................ : CHAN29
 Adapter Type ................ : Parallel Channel
 Transfer Mode and Speed ..... : 4.5 MB Data Streaming
 SNA Management Services ..... : No

 Slot ........................ : 7
 Adapter Name ................ : TOK1
 Adapter Type ................ : Token-Ring 16/4
 Relative Adapter Number ..... : 0
 Node Address ................ : 400020201003
 Data Rate (Mbps) ............ : 16
 To Operator Facility ........ : No
 Combined Functional Addresses : 000000000000

 IEEE 802.2 (LLC)
   Response Timer (T1) ....... : 10  =  2000 ms
   Acknowledgment Timer (T2) . : 1   =    80 ms
   Inactivity Timer ....(Ti) . : 250 = 30000 ms
```

Figure 4. IBM 3172 ICP Configuration

There are two parameters here which must match definitions elsewhere in our example:

Subchannel This value must match the control unit and unit portion of the real address defined to the host for the IBM 3172. In our case the real address 29**60** is defined to VM/ESA.

Node Address This value is the **MAC Address** used by the OS/2 server to find the IBM 3172 gateway to our LANRES/VSE host. This definition has to match the *LAN destination address* field in the Communications Manager/2 definition (see Figure 36 on page 46).

3.1.1.3 Token-Ring Integrated Communication Adapter IOCDS

The last definition was for the Token-Ring Integrated Communication Adapter. It was also used to attach the IBM Token-Ring LAN to our IBM 9221. Prior to the IOCDS definition, you must set up the Token-Ring ICA.

The setup of the Token-Ring Integrated Communication Adapter was made through the IBM 9221 console. From *Monitor the System*, you choose *Customize Input/Output (I/O) Controllers*. Then choose the address of your Token-Ring adapter. Our configuration looked like this:

```
Channel Path                    Description

    03          6140  Comm Pkg  1 6130, 1 6134  TR-4 Or 16 Mbps
```

Figure 5. Customizing Input/Output (I/O) Controllers

Channel Path Must match the CHPID in the IOCDS definition.

Then the window to set up the Token-Ring Integrated Communication Adapter appears. Figure 6 shows the parameters specified in this definition.

```
            Customize Input/Output Controllers

Address                          00 - 0B
Input/Output Adapter Feature     6134
Card                             04
Users                            03
Comment
Node Address                     400020201002
Inactivity Timer                 200  (100 millisecond units)
Enable ring error monitor        0    (1=Yes  0=No)
Ring Speed                       16   Mbps
Disable early token release      1    (1=Yes  0=No)
```

Figure 6. Token-Ring Integrated Communication Adapter Configuration

There are two parameters which must match definitions elsewhere in our example:

Address These two digits will be appended to the *Channel Path* value in Figure 5 in order to supply the adapter physical addresses to the Operating System. In our example we used addresses 300-30B as physical and logical addresses.

Node Address This value is the **MAC Address** used by the OS/2 server to find the Token-Ring ICA to our LANRES/VSE host. This definition has to match the *LAN destination address* field in the Communications Manager/2 definition (see Figure 36 on page 46).

Then you have to make the IOCDS definitions. Figure 7 shows our IOCDS.

```
CHPID    PATH=(03),TYPE=IOC
CNTLUNIT CUNUMBR=(0C0A),PATH=(03),SHARED=N,UNITADD=((00,256)),UNIT=6140
IODEVICE ADDRESS=(0300,12),CUNUMBR=(0C0A),UNIT=ILANS,MODEL=TR
```

Figure 7. IOCDS Definitions for the Token-Ring Integrated Communication Adapter

3.1.2 Update the VM/ESA Directory

For our environment, the MicroChannel to Mainframe Connection, the IBM 3172 and the Token-Ring Integrated Communication Adapter have to be defined in the user directory of our VSE/ESA machine (*'WSVSE212'*).
Because these devices were exclusively used by this machine, we 'dedicated' them to user WSVSE212 as shown in its directory entry below:

```
USER WSVSE212 WSVSE212 128M 128M G
  ACCOUNT V1349336 V1349336
  OPTION MAXCON 150
  MACHINE ESA
  IPL CMS
  CONSOLE 0009 3215 T
         .
         .
DEDICATE  300 300     )
DEDICATE  301 301     )  Token-Ring Integrated Communication Adapter
DEDICATE  302 302     )
DEDICATE  303 303     )
         .
         .
DEDICATE  940 2240    )
DEDICATE  941 2241    )
DEDICATE  942 2242    )
DEDICATE  943 2243    )
DEDICATE  944 2244    )
DEDICATE  945 2245    )
DEDICATE  946 2246    )
DEDICATE  947 2247    )  MicroChannel to Mainframe Connection
DEDICATE  948 2248    )  Subchannels
DEDICATE  949 2249    )
DEDICATE  94A 224A    )
DEDICATE  94B 224B    )
DEDICATE  94C 224C    )
DEDICATE  94D 224D    )
DEDICATE  94E 224E    )
DEDICATE  94F 224F    )
         .
         .
DEDICATE  960 2960    )  IBM 3172 Interconnect Controller
         .
         .
MDISK 0191 9345 1895 5 MM45R1 MR
```

Figure 8. VM Directory Entry for VSE/ESA Version 2.2 Guest Machine

Important Notes

1. Virtual Storage Size of the VSE/ESA Machine

   The virtual storage size in the directory entry for VSE/ESA Version 2.2 was set to 128MB, because we were running our VSE/ESA Version 2.2 system with the **NOPDS** option in the IPL procedure, see Figure 9 on page 19. This means that we don't use a PDS (page data set) in VSE/ESA. All paging activities are handled by VM/ESA.

2. Varying 'On' the Subchannels for the MicroChannel to Mainframe Connection

   When VSE/ESA starts up the subchannels are offline and cannot be varied online, until the LANRES communications (EWXCOMM) is started on the OS/2 server (refer to 4.2.1, "MicroChannel to Mainframe Connection" on page 36).

3.1.3 Install LANRES/VSE on VSE/ESA

You receive LANRES/VSE on the optional product tape when you order VSE/ESA Version 2.2.

To install LANRES/VSE, use the procedure for installing optional products on a stacked tape described in *VSE/ESA Installation, Version 2 Release 1, SC33-6604*.

The default sublibrary for installing LANRES/VSE is PRD2.PROD. In our case we put LANRES/VSE on a separate sublibrary, PRD2.LANRES, and created a second sublibrary, PRD2.LANAPPL, for LANRES/VSE procedures.

3.1.4 Customize VSE/ESA IPL and JCL Procedures

This section describes the following IPL and JCL procedures we customized and used for our LANRES/VSE environment:

1. VSE/ESA IPL procedure
2. JCL startup procedure for the BG partition
3. Job to start up ACF/VTAM
   - This step is only necessary if you are using APPC communication. You don't need ACF/VTAM if you are using channel connection, as described in 1.2, "LANRES/VSE Connectivity" on page 4.
4. JCL procedures to start up the LANRES/VSE applications

Let's now look at these procedures individually.

1. VSE/ESA IPL Procedure

   Figure 9 shows the relevant part of our IPL procedure, *$IPLESA.PROC*, including the statements for the MicroChannel to Mainframe Connection adapter, the IBM 3172 and the Token-Ring ICA for connecting our host to the IBM Token-Ring LAN.

```
CATALOG $IPLESA.PROC REPLACE=YES
009,$$A$SUPX,NOPDS,VIO=512K,VPOOL=128K,LOG
ADD 009,3277
ADD 00C,2540R
ADD 00D,2540P
      .
      .
ADD 300,CETI                    Token-Ring Integrated Communication Adapter
      .
ADD 940:94F,CTCA,EML            MicroChannel to Mainframe Connection
      .
ADD 960,CTCA,EML                IBM 3172 Interconnect Controller
      .
ADD F00:F01,ECKD                DOSRES / SYSWK1
      .
      .
ADD FFF,CONS                    DUMMY CONSOLE, DO NOT DELETE
      .
      .
SVA SDL=300,GETVIS=768K,PSIZE=(256K,2000K)
/+
```

Figure 9. IPL Procedure $IPLESA.PROC for VSE/ESA Version 2.2

Notes:

ADD 300,CETI This is the definition for the Token-Ring Integrated Communication Adapter. The Token-Ring ICA allows up to three independent, concurrent connections. The CETI adapter appears to the mainframe as four adjacent device addresses. In this definition VSE recognizes the CETI device type and assigns four adjacent addresses, 300 through 303.

NOPDS No page data set - as described in 3.1.2, “Update the VM/ESA Directory” on page 17, we used this parameter, to eliminate paging on VSE/ESA. Therefore, there is no VSIZE and DPD specification in the IPL procedure.

ADD 940:94F,CTCA,EML
This statement defines the 16 subchannels we used for the MicroChannel to Mainframe Connection adapter.
Parameter **EML** (emulation) should be coded to have VSE/ESA not check the device, but accept it as defined.

ADD 960,CTCA,EML
This is the definition of the IBM 3172 which we used for our APPC connection.

2. JCL Startup Procedure for the BG Partition

   We customized the default VSE/ESA startup procedure *$0JCL.PROC* to include the JCL statements relevant for LANRES/VSE. See *VSE/ESA Administration, Version 2 Release 1, SC33-6605* for more details on VSE/ESA startup processing.

   - As well as the *$0JCL.PROC* we had to customize two procedures that are called by this one: *ALLOC* (see Figure 11 on page 23) and *USERBG* (see Figure 12 on page 24).

   Figure 10 on page 21 lists our startup procedure.

```
CATALOG $0JCL.PROC          DATA=YES REPLACE=YES
STDOPT ACANCEL=NO,DECK=NO,DUMP=PART,SYSDMP=YES,SXREF=YES
// EXEC PROC=STDLABEL                       LOAD LABEL AREA
// EXEC PROC=SETSDL                         SET SDL
PRTY BG,FB,FA,F9,F8,F7,F6,F5,F4,F2,F3,F1
ASSGN SYSLST,IGN
// JOB BGINIT
// SETPARM XNCPU=¢ ¢
// EXEC PROC=$COMVAR,XNCPU
// EXEC DTRISTRT,SIZE=AUTO,PARM=¢CPUVAR&XNCPU;$$JCLBSX;$$JCLMIN¢
/*
// SETPARM RETCODE=$RC
// SETPARM XSPINIT=¢FINISHED¢
// SETPARM XMODEBG=¢MINI¢
// SETPARM XPARTPW=¢F1¢
// SETPARM XPWMODE=¢WARM¢
// IF RETCODE=1 OR RETCODE=9 THEN
// GOTO ALLOCBSX
// EXEC PROC=CPUVAR&XNCPU,XMODEBG,XPARTPW,XPWMODE,XSPINIT
// IF XSPINIT  = FINISHED THEN
// GOTO NOSDL
// EXEC PROC=LIBSDL
SET SDL
LIST=$SVAVTAM
LIST=$SVACICS
LIST=$SVAREXX
LIST=$SVAASMA
/*
// LIBDROP PHASE
EXPLAIN ON
/. NOSDL
// IF XMODEBG=BASIC THEN
// GOTO ALLOCBSX
// EXEC PROC=ALLOC                      PARTITION ALLOCATIONS
// GOTO PWRSTRT
/. ALLOCBSX
// EXEC PROC=ALLOCBSX   ALLOCS FOR BASIC START
// SETPARM XPARTPW=F1
/. PWRSTRT
START &XPARTPW
STOP
ASSGN SYSIN,FEC,PERM
ASSGN SYSPCH,FED
ASSGN SYSLST,FEE
ASSGN SYSLNK,DISK,VOL=DOSRES,SHR          SYSTEM LINK FILE
ASSGN SYS001,DISK,VOL=SYSWK1,SHR          SYSTEM WORK FILE 1
ASSGN SYS002,DISK,VOL=SYSWK1,SHR          SYSTEM WORK FILE 2
ASSGN SYS003,DISK,VOL=SYSWK1,SHR          SYSTEM WORK FILE 3
ASSGN SYS004,DISK,VOL=SYSWK1,SHR          SYSTEM WORK FILE 4
```

Figure 10 (Part 1 of 2). JCL Startup Procedure $0JCL.PROC for the BG Partition

```
// IF XSPINIT  = FIRST THEN
// GOTO SKIP
* ****************************************
*                                        *
*            INSTALLATION OF             *
// EXEC PROC=SPLEVEL
*                                        *
* ****************************************
// EXEC PROC=LOADINST
// EXEC DTRSETP,PARM=¢CPUVAR1;;¢
   SET XSPINIT= INSTALL
/*
// PWR PRELEASE RDR,INSTALL
// GOTO EXIT
/. SKIP
// PWR PRELEASE RDR,EWXINST
// IF XPWMODE=COLD OR XPWMODE=BASIC THEN
// GOTO COLDPART
// GOTO ENDCOLD
/. COLDPART
// ID USER=FORSEC              !! NO PWD REQUIRED !!
// EXEC PROC=COLDJOBS
/. ENDCOLD
// IF XMODEBG  = MINI THEN
// GOTO NOTMINI
// EXEC PROC=MINIBG
// GOTO EXIT
/. NOTMINI
// IF XMODEBG  = BASIC THEN
// GOTO USER
// ID USER=FORSEC              !! NO PWD REQUIRED !!
// EXEC PROC=BASICBG
// GOTO EXIT
/. USER
// EXEC PROC=USERBG
/. EXIT
/&
/+
```

Figure 10 (Part 2 of 2). JCL Startup Procedure $0JCL.PROC for the BG Partition

Notes:

LIST=$SVAREXX

This is the SVA-loadlist for REXX/VSE. This statement is required for REXX/VSE, which is, in turn, required by LANRES/VSE.

// EXEC PROC=ALLOC

This procedure (listed in Figure 11 on page 23) establishes several static partitions for the LANRES/APPC code (F4) and the individual LANRES/VSE applications (F5 to F8) in our environment. All of these could run as well in dynamic partitions.

// PWR PRELEASE RDR,EWXINST

This statement causes the LANRES/VSE-supplied job *EWXINST* to be started which loads a particular LANRES phase into the SVA.

// EXEC PROC=USERBG

This procedure initializes REXX/VSE, starts VTAM (required if APPC is used for LANRES/VSE communications) and starts up CICS; see Figure 12 on page 24.

```
CATALOG ALLOC.PROC                DATA=YES REPLACE=YES
ALLOC BG=1536K
SIZE BG=1280K
ALLOC F1=1600K
SIZE F1=768K
ALLOC F2=30M
SIZE F2=7M
ALLOC F3=6144K
SIZE F3=600K
ALLOC F4=2M          APPC-LANRES
SIZE  F4=1M
ALLOC F5=8M          LANRES APPL.(DISK SERVING)
SIZE  F5=2M
ALLOC F6=8M          LANRES APPL.(DISTRIBUTION/ADMINISTRATION)
SIZE  F6=2M
ALLOC F7=8M          LANRES APPL.(HOST TO LAN PRINTER)
SIZE  F7=2M
ALLOC F8=8M          LANRES APPL.(LAN TO HOST PRINTER)
SIZE  F8=2M
ALLOC F9=512K
SIZE F9=256K
ALLOC FA=512K
SIZE FA=256K
ALLOC FB=512K
SIZE FB=256K
SYSDEF DSPACE,DSIZE=30M,DFSIZE=2M
NPGR BG=100,F2=255,F3=100,F4=100,F5=50,F6=50,F7=50,F8=200
/+
```

Figure 11. ALLOCATE Storage Procedure for LANRES/VSE

```
CATALOG USERBG.PROC               DATA=YES REPLACE=YES
* START MODE FOR BG-PARTITION IS NORMAL
* ****************************************
// EXEC PROC=SPLEVEL
* ****************************************
// EXEC PROC=LIBDEF
// LIBDEF DUMP,CATALOG=SYSDUMP.BG,PERM
// EXEC ARXLINK                          INITIALIZE REXX/VSE
// SETPARM XNCPU=¢¢
// EXEC PROC=$COMVAR,XNCPU               GET CPU NUMBER
// SETPARM TPMODE=¢¢
// SETPARM XENVNR=¢¢
// EXEC PROC=CPUVAR&XNCPU,TPMODE,XENVNR  GET INFO OUT OF CPUVAR
// IF TPMODE=B THEN
// GOTO NOVTAM
// IF XENVNR=C THEN
// GOTO NOVTAM
// PWR PRELEASE RDR,VTAMLRS              START VTAM FOR LANRES
// EXEC IESWAIT,PARM=¢03¢
/. NOVTAM
// PWR PRELEASE RDR,CICSICCF             START CICS
/+
```

Figure 12. USERBG Procedure USERBG.PROC for VSE/ESA Version 2.2

Note: .

// PWR PRELEASE RDR,VTAMLRS

This statement releases the job VTAMLRS to load VTAM with the definitions for LANRES/VSE. This job is specified in Figure 13 on page 25.

3. Job to start up ACF/VTAM

   - This step is only necessary if you are using APPC communication. You don't need ACF/VTAM if you are using Channel connection, as described in 1.2, "LANRES/VSE Connectivity" on page 4.

   The following figure shows the job to start up VTAM for LANRES/VSE.

```
* $$ JOB JNM=CATVTAM,DISP=D,CLASS=0
// JOB CATVTAM            CATALOG VTAMLRS AND LDVTAM, LOAD VTAMLRS
// EXEC LIBR,PARM=¢MSHP¢
ACC S=IJSYSRS.SYSLIB
CATALOG  VTAMLRS.Z        REPLACE=YES
$$$$ JOB JNM=VTAMLRS,DISP=L,CLASS=3
// JOB VTAMLRS  START VTAM
// OPTION DUMP,SADUMP=5
// SETPARM XNCPU=¢¢
// EXEC PROC=$COMVAR,XNCPU
// EXEC DTRSETP,PARM=¢CPUVAR&XNCPU;;SET XSTATF3=ACTIVE¢
$$/*
// SETPFIX LIMIT=424K
// ASSGN SYS000,UA
// ASSGN SYS001,DISK,VOL=SYSWK1,SHR     TRACE FILE ASSIGNMENT
// ASSGN SYS004,DISK,VOL=SYSWK1,SHR     TRACE FILE ASSIGNMENT
// ASSGN SYS005,DISK,VOL=SYSWK1,SHR     NCP LOAD/DIAG FILE ASSGN
// LIBDEF PHASE,SEARCH=(PRD2.COMM,PRD2.COMM2,PRD2.CONFIG,              C
               PRD1.BASED,PRD1.BASE),PERM
// LIBDEF   OBJ,SEARCH=(PRD2.COMM,PRD2.COMM2,PRD2.CONFIG,              C
               PRD1.BASED,PRD1.BASE),PERM
// LIBDEF SOURCE,SEARCH=(PRD2.COMM,PRD2.COMM2,PRD2.CONFIG,             C
               PRD1.BASED,PRD1.BASE),PERM
// LIBDEF   DUMP,CATALOG=SYSDUMP.F3,PERM
// EXEC ISTINCVT,SIZE=ISTINCVT,PARM=¢CUSTNO=Cxxx-xxx-xxxx,VTAMPW=xxxx-xc
               xxx-xxxx-xxxx-xxxx,LIST=01¢,DSPACE=8M
// EXEC DTRSETP,PARM=¢CPUVAR&XNCPU;;SET XSTATF3=INACTIVE¢
$$/*
$$/&
$$$$ EOJ
/+
CATALOG  LDLRS.PROC    REPLACE=YES DATA=YES
// EXEC DTRIINIT
   LOAD VTAMLRS.Z
/*
/+
/*
// EXEC PROC=LDLRS         TO LOAD  VTAM STARTUP  INTO RDR QUEUE
/&
* $$ EOJ
```

Figure 13. VTAM Startjob VTAMLRS

Notes:

LIST=01 It is used to specify a different set of resources to be used for LANRES/VSE.

DSPACE=8M See *Caution* below.

Caution

This job starts ACF/VTAM V4.2 on VSE/ESA. If VTAM runs in the VSE/ESA data space, make sure to increase your data space accordingly. You can't use the default size of 2M in this case. We increased our size to 8M (see **DSPACE=8M** in Figure 13) and ran all LANRES/VSE applications without problems.

4. JCL procedures to start up the LANRES/VSE applications

   The startup jobs for the individual LANRES applications as well as the ones required for setting up the connection to the OS/2 server, are described in the corresponding chapters for the applications.

   To start LANRES/VSE applications you use a job similar to the one shown in Figure 14.

```
* $$ JOB JNM=STRTFUN,CLASS=6,DISP=D
// JOB STRTFUN                          Start function
// LIBDEF *,SEARCH=(PRD2.LANAPPL,PRD2.LANRES)
// SET PARM COMM=nnnn
// IF COMM=CHANNEL THEN
// SETPFIX LIMIT=16K,PERM
/*
// EXEC REXX=STRTFUN
/*
/&
* $$ EOJ
```

Figure 14. LANRES Start Function Job

Note

The **nnnn** variable should be replaced by the communication protocol (APPC or CHANNEL).

The 'SETPFIX' statement is **only** required if communication via channel (MMC or ESCON) is used.

STRTFUN should be replaced by the respective function of LANRES.

3.2 Set up VSE/ESA for OS/2 Server Communications

This section describes how to set up the connection between LANRES/VSE on the host and LANRES/VSE on the OS/2 server.

From the possible options to connect the OS/2 server and LANRES/VSE on the host described in 1.2, "LANRES/VSE Connectivity" on page 4 we installed and customized the following three:

1. MMC, that is MicroChannel to Mainframe Connection using parallel channel.
2. APPC, that is APPC (SNA LU 6.2) via an IBM Token-Ring LAN using IBM 3172 Interconnect Controller, (ACF/VTAM on the host and Communications Manager/2 on the OS/2 server).
3. APPC using Token-Ring Integrated Communication Adapter.

3.2.1 MicroChannel to Mainframe Connection

All you have to consider from a VSE/ESA point of view is to decide which subchannel pair of the MicroChannel to Mainframe Connection will be used for which LANRES/VSE application and then customize it. Since each LANRES/VSE application runs in its own partition, this means that you have to map the MicroChannel to Mainframe Connection subchannel pairs to the corresponding LANRES/VSE partition. For a conceptual illustration of this see Figure 15 on page 27.

To use MMC in our environment we did the following:

1. Define the MicroChannel to Mainframe Connection adapter in the IOCDS (see 3.1.1, “Customize the IOCDS” on page 13).
2. Make it available to our VSE machine (see 3.1.2, “Update the VM/ESA Directory” on page 17).
3. ADD it to the VSE/ESA IPL procedure (see 3.1.4, “Customize VSE/ESA IPL and JCL Procedures” on page 19).

Now we mapped the MMC subchannel pairs to the individual LANRES/VSE applications as follows:

LANRES Application	MMC Subchannel Addresses	Starts in Partition
Disk Serving	940 - 941	F5
Distribution/Administration	942 - 943	F6
Host-to-LAN Printing	944 - 945	F7
LAN-to-Host Printing	946 - 947	F8

Figure 15. Mapping MMC Subchannels to LANRES/VSE Applications

When the individual LANRES/VSE applications are started, **the corresponding even subchannel** has to be specified during its startup (see, for example, in 6.3, “Start the LANRES/VSE Disk Server on the Host” on page 59).

In order to save resources, you can, of course, run the LANRES/VSE applications one after the other and consume less subchannel pairs.

3.2.2 APPC Connection Using IBM 3172

This type of connection uses an IBM Token-Ring LAN to connect the host and the OS/2 server. If you choose this option, APPC is mandatory, that is, you always need and must configure ACF/VTAM V4.2 on the host and Communications Manager/2 Communications Server/2 on the OS/2 server side.

We used the IBM 3172 Interconnect Controller and the Token-Ring Integrated Communication Adapter to connect our host to the Token-Ring. Of course, any other controller (for example, IBM 3174 or IBM 3745) can be used as well.

3.2.2.1 IBM 3172 Define Connection

In order to customize our IBM 3172-Token-Ring connection the following steps were necessary:

1. Customize the IBM 3172.
2. Define the IBM 3172 to VTAM as an External Communication Adapter (XCA) major node.
3. Define a VTAM SWNET Major Node for communication with Communications Manager/2.
4. Define a VTAM APPL Major Node for the LANRES/VSE applications.

5. Create a Job to start the APPC connection to Communications Manager/2.

Let us now look at the individual steps in more detail.

1. Customizing the IBM 3172 Interconnect Controller

   Chapter 3.1, “LANRES/VSE Installation” on page 13 describes how we attached our 3172 to the Token-Ring. The physical connection in our IBM 9221 host is via address **960**, see also Figure 9 on page 19.

2. Define the VTAM XCA Major Node for the IBM 3172

   Figure 16 shows our VTAM XCA Major Node definition for the IBM 3172.

```
* $$ JOB JNM=LRS3172,CLASS=C,DISP=D
// JOB LRS3172    CATALOG LRS3172.B CTCA-DEFINITION  FOR 3172
// EXEC LIBR,PARM=¢MSHP¢
ACC S=PRD2.CONFIG
DELETE LRS3172.SAVE
RENAME LRS3172.B:LRS3172.SAVE
CATALOG LRS3172.B R=Y
*
LRS3172 VBUILD TYPE=XCA
*
LRS3172P PORT CUADDR=960,                                          C
               ADAPNO=0,                                           C
               MEDIUM=RING,                                        C
               TIMER=60
*
LRS3172G GROUP DIAL=YES
*
L317201  LINE  ISTATUS=ACTIVE,CALL=INOUT,ANSWER=ON
P317201  PU    ISTATUS=ACTIVE
/+
/*
/&
* $$ EOJ
```

Figure 16. VTAM XCA Major Node Definition for APPC Connection via IBM 3172

Notes:

LRS3172	Name of the XCA Major Node definition.
CUADDR=960	Specifies the physical attachment of the IBM 3172 Interconnect Controller and matches the definitions in Figure 4 on page 15, Figure 8 on page 18 and Figure 9 on page 19.
LINE and **PU**	One LINE/PU pair is required for each OS/2 server to which VTAM has to communicate. Because we are communicating to only one OS/2 server, we defined only one LINE/PU pair.

3. Define the VTAM SWNET Major Node for the IBM 3172 APPC Connection

   Figure 17 on page 29 shows the VTAM SWNET Major Node definition we used.

```
* $$ JOB JNM=LRSSWOS2,CLASS=C,DISP=D
// JOB LRSSWOS2                        CATALOG LRSSWOS2.B
// EXEC LIBR,PARM=¢MSHP¢
ACCESS SUBLIB=PRD2.CONFIG
DELETE LRSSWOS2.SAVE
RENAME LRSSWOS2.B:LRSSWOS2.SAVE
CATALOG LRSSWOS2.B                       REPLACE=YES
LRSSWOS2 VBUILD TYPE=SWNET,MAXGRP=20,MAXNO=20
*
OS2PU2   PU    ADDR=03,                                          C
               CPNAME=OS2LU2,                                    C
               LANSW=YES,                                        C
               DISCNT=NO,                                        C
               ISTATUS=ACTIVE,                                   C
               PACING=1,                                         C
               VPACING=1,                                        C
               MAXOUT=1,                                         C
               MAXDATA=265,                                      C
               SAPADDR=4,                                        C
               PUTYPE=2,                                         C
               MAXPATH=1
OS2LU2   LU    LOCADDR=0,                                        C
               DLOGMOD=#INTER,                                   C
               LOGAPPL=VSELRS1,                                  C
               MODETAB=IESINCLM
 /+
 /*
 /&
* $$ EOJ
```

Figure 17. VTAM SWNET Major Node Definition for APPC Connection

Notes:

LRSSWOS2 Name of the SWNET Major Node definition.

CPNAME=OS2LU2
Specifies the CPNAME we used and must match the *Local node name* in the Communications Manager/2 profile definition as shown in Figure 27 on page 41.

SAPADDR=4
We used default address '4'.

LOCADDR=0
For the APPC connection the LOCADDR must always be set to '0'.

MODETAB=IESINCLM and **DLOGMOD=#INTER**
We use the entry '#INTER' in the default logon mode table IESINCLM supplied by VSE/ESA. #INTER assumes an RUSIZE of X'8787' (=1024 Bytes) and you should make sure that this corresponds to the RUSIZE used by Communications Manager/2 or Communications Server/2 as shown in Figure 39 on page 47. The *RU size* in the Communications Manager/2 mode definition should therefore be at least decimal '1024' which corresponds to the X'8787' VTAM definition.

For performance reasons, we also tried a second setup where we specified a VTAM RUSIZE of X'8B8B' in the LOGMODE table and the corresponding decimal 16384 as *RU size* in the Communications Manager/2 mode definition. This gave us a significantly better performance for all LANRES applications using the APPC connection. For more details on VTAM's definition of RUSIZEs refer to chapter "SNA LU 6.2 Configuration" in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624*.

Figure 18 lists the '#INTER' logon mode table entry described above.

LOGAPPL=VSELRS1

Specifies the name of the VSE/VTAM application major node shown in Figure 19 on page 31. This name must match the *Partner node name* in the Communications Manager/2 specifications as shown in Figure 36 on page 46.

```
#INTER   EQU *
    MODEENT LOGMODE=#INTER,                                          C
               FMPROF=X¢13¢,TSPROF=X¢07¢,PRIPROT=X¢B0¢,              C
               SECPROT=X¢B0¢,COMPROT=X¢D0B1¢,RUSIZES=X¢8787¢,        C
               SSNDPAC=X¢00¢,SRCVPAC=X¢00¢,PSNDPAC=X¢00¢,            C
               TYPE=0,                                               C
               PSERVIC=X¢060200000000000000002F00¢
```

Figure 18. Logon Mode Table Entry '#INTER'

4. Define the VTAM APPL Major Node for the LANRES/VSE Applications

   Figure 19 on page 31 shows you our VTAM APPL Major Node definition.

```
* $$ JOB JNM=LRSAPPL,CLASS=C,DISP=D
// JOB LRSAPPL     CATALOG LRSAPPL.B
// EXEC LIBR,PARM=¢MSHP¢
ACC S=PRD2.CONFIG
DELETE LRSAPPL.SAVE
RENAME LRSAPPL.B:LRSAPPL.SAVE
CATALOG LRSAPPL.B                          REPLACE=YES
LRSAPPL  VBUILD TYPE=APPL
VSELRS1  APPL  APPC=YES,                                          C
               AUTH=(PASS,ACQ),                                   C
               AUTOSES=16,                                        C
               DMINWNL=8,                                         C
               DMINWNR=8,                                         C
               DSESLIM=16,                                        C
               MODETAB=IESINCLM,                                  C
               DLOGMOD=#INTER,                                    C
               PARSESS=YES
/+
/*
/&
* $$ EOJ
```

Figure 19. VTAM APPL Major Node Definition for the LANRES/VSE Applications

Notes:

LRSAPPL Name of the VTAM APPL Major Node definition.

VSELRS1 Specifies the name of the VSE/VTAM application major node shown in Figure 19. This name must match the *Partner node name* in the Communications Manager/2 specifications as shown in Figure 36 on page 46.

5. Create the Job to start APPC

   The job in Figure 20 starts APPC delivered with VSE/ESA Version 2.2. It must have been started **before using the LANRES/VSE applications**, see chapter "Setting Up the VSE System" in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624*.

   The application major node name (APPL definition) for APPC, *'VSELRS1'*, is supplied as a parameter in the // EXEC statement.

```
* $$ JOB JNM=LRSAPPC,CLASS=4,DISP=L
// JOB LRSAPPC     START LANRES-APPC in F4   LOCAL-LU-NAME=VSELRS1
* STOP: MSG FX,DATA=STOP
// EXEC INWAAPPC,SIZE=200K,PARM=¢VSELRS1¢
/*
/&
* $$ EOJ
```

Figure 20. VSE/ESA Version 2.2 APPC Startup Job

Note: .

PARM='VSELRS1'

Specifies the name of the VSE/VTAM application major node definition shown in Figure 19. See Notes on Figure 17 on page 29.

3.2.2.2 Start the IBM 3172 APPC Connection

At this point in time you are ready to start up the APPC connection using the following sequence:

1. Initiate ACF/VTAM V4.2 by activating the following books (refer to the individual major node definitions for the book names):

   v net,act,id=lrsappl
   v net,act,id=lrsswos2
   v net,act,id=lrs3172

2. Start up APPC on VSE/ESA Version 2.2 using the job listed in Figure 20 on page 31:

   r rdr,lrsappc

Once your OS/2 server has been set up and started (see 4.2.2.3, “Start APPC Connection” on page 51), you can run LANRES/VSE applications.

3.2.3 APPC Connection using Token-Ring Integrated Communication Adapter

This is another possibility to connect the host and the OS/2 server via an IBM Token-Ring LAN. If you choose this option, APPC is mandatory, that is, you always need and must configure ACF/VTAM V4.2 on the host and Communications Manager/2 or Communications Server/2 on the server side.

For the Token-Ring attachment of course any other controller (for example, IBM 3174 or IBM 3745) could be used as well.

3.2.3.1 Token-Ring ICA Define Connection

The customization for our Token-Ring Integrated Communication Adapter connection is very similar to the connections described in the previous chapters. You need to perform the same steps:

1. Customize the Token-Ring ICA.
2. Define the Token-Ring ICA to VTAM as a LAN major node to define the local area network physical resources.
3. Define a VTAM SWNET Major Node to define the logical connections over the Token-Ring, this is the communication with Communications Manager/2.
4. Define a VTAM SWNET Major Node for the LANRES/VSE applications.
5. Create a job to start the APPC connection to Communications Manager/2.

Let us now look at the individual steps in more detail.

1. Customizing the Token-Ring Integrated Communication Adapter

   Chapter 3.1, “LANRES/VSE Installation” on page 13 describes how we attached our Token-Ring ICA to the Token-Ring. The physical connection in our IBM 9221 host is via address **300**, see also Figure 9 on page 19.

2. Define the VTAM LAN Major Node for the Token-Ring ICA

   Figure 21 on page 33 shows our VTAM LAN Major Node definition for the Token-Ring Integrated Communication Adapter.

```
* $$ JOB JNM=LRSCETI,CLASS=C,DISP=D
// JOB LRSCETI    CATALOG LRSCETI.B
// EXEC LIBR,PARM=¢MSHP¢
ACC S=PRD2.CONFIG
DELETE LRSCETI.SAVE
RENAME LRSCETI.B:LRSCETI.SAVE
CATALOG LRSCETI.B     REPLACE=YES
*
LRSCETI  VBUILD TYPE=LAN
*
LRSCETIP PORT  CUADDR=300,                                          C
               MACADDR=400020201002,                                C
               LANCON=(8,8),                                        C
               MAXSTN=32,                                           C
               MAXDATA=2012,                                        C
               SAPADDR=4
*
LRSCETIG GROUP DIAL=YES,                                            C
               ISTATUS=ACTIVE,                                      C
               CALL=INOUT,                                          C
               ANSWER=ON
*
LCETI01  LINE
PCETI01  PU
/+
/*
/&
* $$ EOJ
```

Figure 21. VTAM LAN Major Node Definition for APPC Connection via Token-Ring ICA

Notes:

LRSCETI Name of the LAN major node definition.

CUADDR=300 Specifies the physical attachment of the Token-Ring Integrated Communication Adapter and matches the definitions in Figure 7 on page 17, Figure 8 on page 18 and Figure 9 on page 19.

MACADDR=400020201002
Specifies the LAN Medium Access Control Address of the Token-Ring Integrated Communication Adapter. It must match the definition of the MACADDR specified in Figure 6 on page 16 and the *LAN destination address* field in the Communications Manager/2 definition (see Figure 36 on page 46).

SAPADDR=4 Specifies the LAN Service Access Point Address. We used default address '4'.

LINE and **PU** One LINE/PU pair is required for each OS/2 server to which VTAM has to communicate. Because we are communicating to only one OS/2 server, we defined only one LINE/PU pair.

3. Define the VTAM SWNET Major Node for the Token-Ring ICA APPC Connection

The VTAM SWNET Major Node definition for APPC is the same for IBM 3172 Interconnect Controller or Token-Ring ICA. Therefore, we used the SWNET already defined (see Figure 17 on page 29).

4. Define the VTAM APPL Major Node for the LANRES/VSE Applications

   Here we can use the major node definition already made for the APPC/3172 connection, see Figure 19 on page 31.

5. Create the Job to start APPC

   Again we use the job already created for the APPC/3172 connection, see Figure 20 on page 31.

3.2.3.2 Start the Token-Ring ICA APPC Connection

At this point in time you are ready to start up the Token-Ring ICA APPC connection using the following sequence:

1. Initiate ACF/VTAM V4.2 by activating the following books (refer to the individual major node definitions for the book names):

   v net,act,id=lrsappl
   v net,act,id=lrsceti
   v net,act,id=lrsswos2

2. Start up APPC on VSE/ESA Version 2.2 using the job listed in Figure 20 on page 31:

   r rdr,lrsappc

Once your OS/2 server has been set up and started (see 4.2.2.3, “Start APPC Connection” on page 51), you can run LANRES/VSE applications.

Chapter 4. Installing and Setting Up LANRES/VSE on the OS/2 Server

To prepare the OS/2 server for LANRES/VSE and communication to VSE/ESA, the following implementation and customization steps are required:

1. Install LANRES/VSE on the OS/2 server
2. Customize LANRES/VSE on the OS/2 server
3. Set up the OS/2 server for communications to VSE/ESA

Each of these tasks will be described in detail in the subchapters below.

Note

We assume that an OS/2 LAN is already in operation or that you are familiar with the installation and customization of the OS/2 server and its corresponding OS/2 LAN clients. This means, no information is provided in this document on this subject. However, LANRES can be installed on any OS/2 Warp system that is connected to the VSE/ESA host. There is no need to run OS/2 LAN server (or WARP server) software on the OS/2 system if you don't have OS/2 LAN client machines that also want to make use of the LANRES applications running on the server.

Refer to the appropriate OS/2 server documentation, for example *OS/2 WARP Server Up and Running*, for details regarding OS/2 LAN setup.

4.1 LANRES/VSE Installation

The OS/2 server part of LANRES/VSE is delivered on two diskettes containing the LANRES/VSE PC Code and is part of VSE/ESA Version 2.2.

We finished the LANRES/VSE installation on the OS/2 server by performing the following steps:

1. Insert the first diskette (labeled **INSTALL**) into **drive A:** and enter the following command on the command prompt of an OS/2 window:
   a:\install
2. Press **Continue** in the *Instructions for Installation* window.
3. In the *INSTALL* window, make sure that a checkmark is in the *Update CONFIG.SYS* option and press **OK**.
4. In the *Install-directories* window choose English Language, and specify **C:\LANRES** as the installation directory. Then press **Install**.
5. When the system asks for the new diskette, replace the INSTALL by the LANRES diskette and press **Continue**.
6. In the *Installation and Maintenance* window press **OK**.
7. When the installation process finishes, the VSE Logo displays. Press **Exit**.
8. Reboot your system.

Now LANRES is installed on your system and the following LANRES folder has been added to your OS/2 desktop.

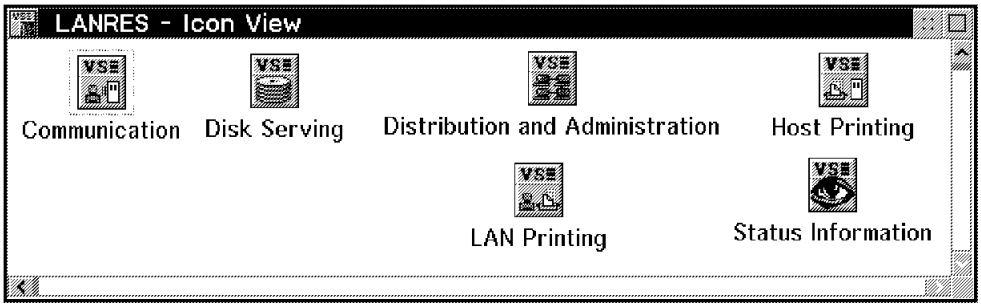

Figure 22. Initial Icons of the LANRES/VSE Folder

You can use this folder to:

- Define initialization settings for LANRES/VSE applications and for communications between the server and VSE/ESA.
- Start and stop communications or LANRES/VSE functions.
- Monitor LANRES/VSE status.

4.2 Set Up the OS/2 Server for Communications

From the possible options to connect the OS/2 server and LANRES/VSE on the host described in 1.2, “LANRES/VSE Connectivity” on page 4 we installed and customized the following three:

1. MMC, that is MicroChannel to Mainframe Connection using parallel channel.
2. APPC, that is APPC (SNA LU 6.2) via an IBM Token-Ring LAN using IBM 3172 Interconnect Controller, (ACF/VTAM on the host and Communications Manager/2 on the OS/2 server).
3. APPC using Token-Ring Integrated Communication Adapter

Using the MicroChannel to Mainframe Connection has advantages from a performance point of view, but requires additional hardware, that is the MicroChannel to Mainframe Connection adapter card and cabling.

The following sections describe our setup for the two connectivity options we chose.

4.2.1 MicroChannel to Mainframe Connection

The MicroChannel to Mainframe Connection connects the OS/2 server PS/2 MicroChannel directly to the IBM 9221 parallel channel. From the host side, the MMC is seen as a CTCA (Channel-to-Channel-Adapter) as described in Figure 9 on page 19. From the OS/2 server point of view, the MMC is recognized and driven by the MMC Device Driver (PCADD.SYS) that comes with the LANRES/VSE diskettes.

From the above it is clear that both sides need information on how the channel connection should be used, that is how the subchannels are used by the different LANRES/VSE applications.

On the OS/2 server side this is specified in one control file for the MMC Device Driver, *PSCA.CFG*, and in the *Communication-Settings* window for the LANRES part. If you want to have another channel connection to a different host, you will

need a second MMC adapter card and a second control file, for example, PSCA2.CFG.

Figure 23 illustrates our MicroChannel to Mainframe Connection environment from a conceptual point of view.

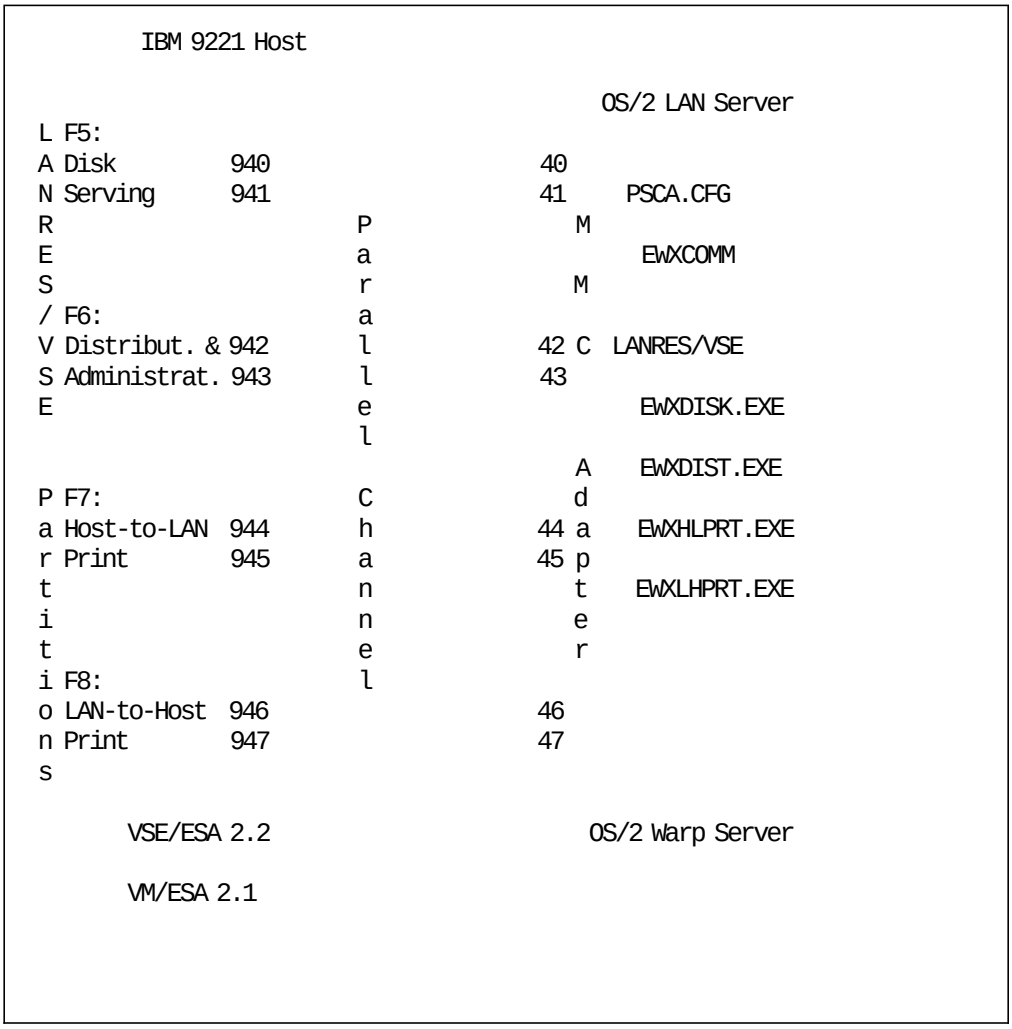

Figure 23. MicroChannel to Mainframe Connection Concept for LANRES/VSE

From the illustration above you can see:

- which subchannel addresses are used by the LANRES/VSE host applications
- the mapping of the host subchannel addresses on the OS/2 server side

4.2.1.1 Define Subchannels on the OS/2 Server

In order to let the OS/2 server recognize the subchannel, we finished the following steps:

1. Access the LANRES folder on OS/2 server (see Figure 22 on page 36)
2. Select the Communication icon and then the settings for parallel channel connection (see Figure 24)

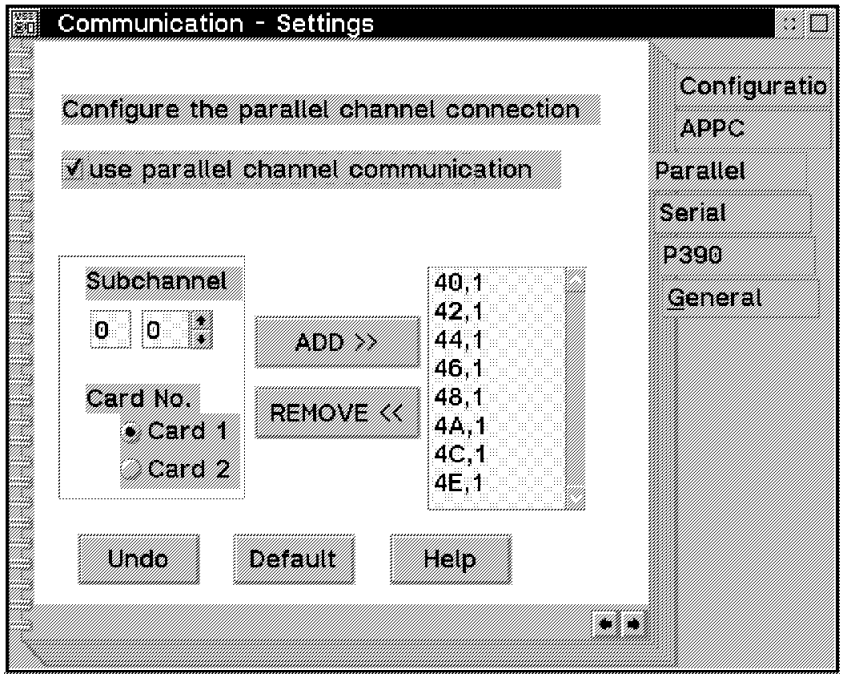

Figure 24. Communication Settings for MMC Connection

3. Click the **use parallel channel communication** option. In the **Subchannel** field, specify the subchannels to be used for each LANRES function. If there are more than one MMC adapter cards, you should also select which one will be used.

   Note

   The subchannel must be an even address and the last two characters of a three-character address which is defined in the VSE IPL procedure. You should ensure that these subchannel addresses are not used by other control units on the same channel. The maximum number of subchannels is 128 and the address ′FX′ cannot be used.

4. Copy the workstation file PSCA.SAM to PSCA.CFG in the subdirectory where LANRES was installed. Modify the copy (PSCA.CFG) according to your channel speed and subchannel address (see Figure 25 on page 39).

```
DSPD=4
ADDR=40 1 2
ADDR=41 1 2
ADDR=42 1 2
ADDR=43 1 2
ADDR=44 1 2
ADDR=45 1 2
ADDR=46 1 2
ADDR=47 1 2
ADDR=48 1 2
ADDR=49 1 2
ADDR=4A 1 2
ADDR=4B 1 2
ADDR=4C 1 2
ADDR=4D 1 2
ADDR=4E 1 2
ADDR=4F 1 2
TABL=1 C:\LANRES\CU3088B.STD
TABL=2 C:\LANRES\CU3088E.STD
```

Figure 25. The PSCA.CFG File

The above settings have the following meanings:

DSPD=4 The channel runs at 4.5MB per second in data streaming mode.

ADDR=nn x y
We use host subchannel addresses X'40' to x'47' for the LANRES/VSE applications and command decode tables, B and E, which are specified in the **TABL=x** and **TABL=y** statements.

Refer to chapter 'Defining Subchannel on OS/2 Server' in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624* for more details and an explanation of the other parameters.

5. Ensure the Select/Bypass switch on the cable connector is on S (select) to enable the MMC channel connection.
6. In the CONFIG.SYS file, delete the **REM** which is in front of the PCADD.SYS device driver statement:

   ```
   DEVICE=C:\LANRES\PCADD.SYS M=C:\LANRES\PSCA.ABS C1=C:\LANRES\PSCA.CFG S1=*
   ```

7. Reboot OS/2 to active the MMC device driver.

4.2.1.2 Start MMC Connection

Now you can start up the communication to LANRES/VSE on the host from the OS/2 server side.
You just need to double click the *Communications* icon in the LANRES folder (Figure 22 on page 36) on the OS/2 server or type **start ewxcomm** on an OS/2 server command line prompt.

4.2.2 APPC Connection

To run LANRES with an APPC connection over an IBM Token-Ring LAN, it's necessary to:

- Customize the Communications Manager/2 or Communications Server/2 to communicate with VSE/ESA
- Specify the communication startup options

- Start LANRES/VSE on the OS/2 server and on VSE/ESA

4.2.2.1 Customize Communications Manager/2 on the OS/2 Server for APPC

Before you start LANRES/VSE and use its functions, you need to set up the Communications Manager/2 to be able to connect to the host. Customize the Communications Manager/2 on the OS/2 server, to match the VTAM definitions made for the LANRES APPC connection. This is described in Chapter 3.

Step 1 Open *the Communication Manager* folder from the desktop. Access the *Communication Manager Setup* window. Press **Setup**.

Step 2 In the *Open Configuration* panel we typed **LRSOS2** as the name for the new configuration profile to be created. Then press **OK**. Answer **Yes** to the two following questions: *New File being created* and *Configuration used for this Workstation*.

Step 3 In the *Communications Manager Configuration Definition* window (Figure 26):

- Select **APPC APIs through Token-Ring**
- Press **Configure**

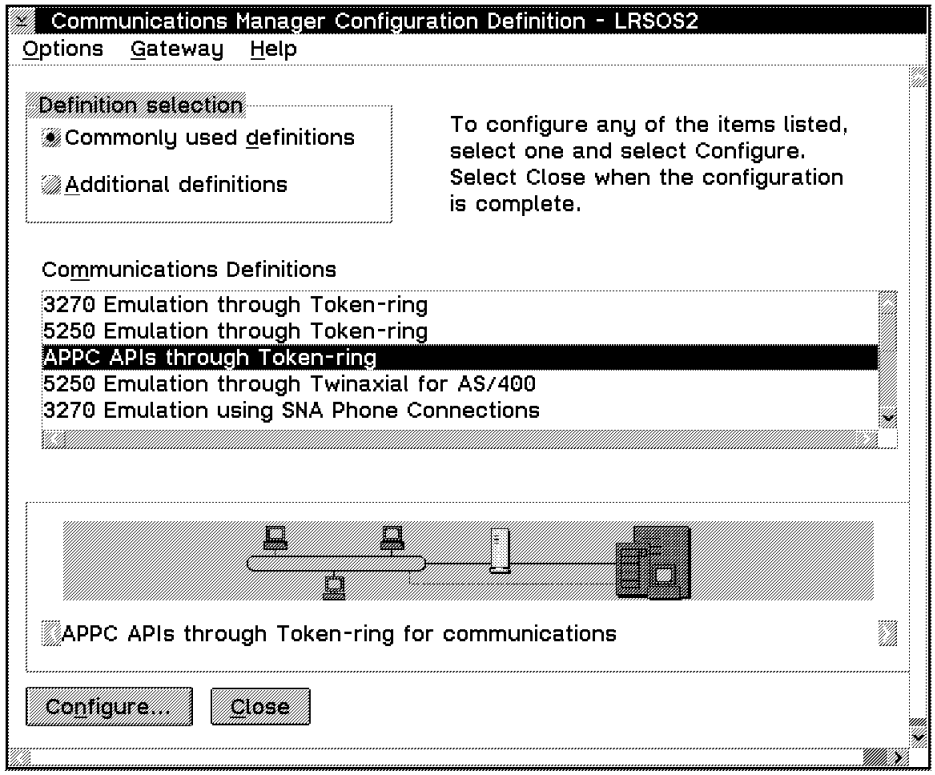

Figure 26. Communications Manager Configuration Definition

Step 4 In the *APPC APIs through Token-ring* window (Figure 27 on page 41):

- Specify **VTAM1** as *Network ID*. This name must match the *NETID* value we specified in the VTAM definitions on the VSE host (see Figure 88 on page 121)
- Fill in the *Local node name* with **OS2LU2**, defined as LU in VTAM (see Figure 17 on page 29)

- Make sure **End node - no network node server** is selected
- Press **Advanced**

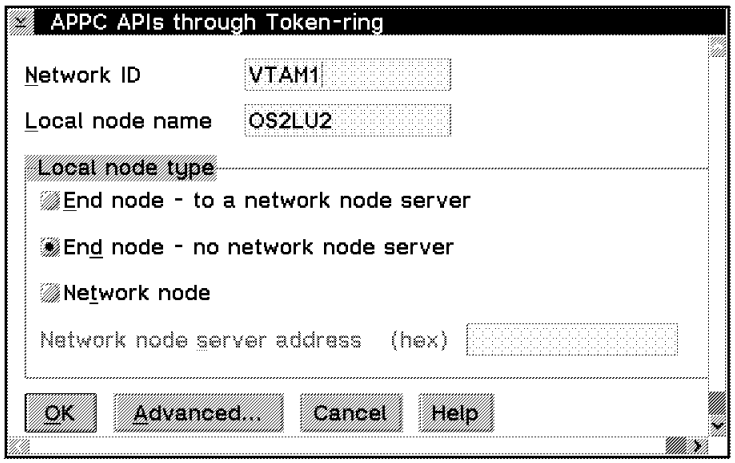

Figure 27. APPC APIs through Token-Ring

Step 5 In the *Communications Manager Profile List* window (Figure 28):

- Select **DLC - Token-ring or other LAN types**
- Press **Configure**

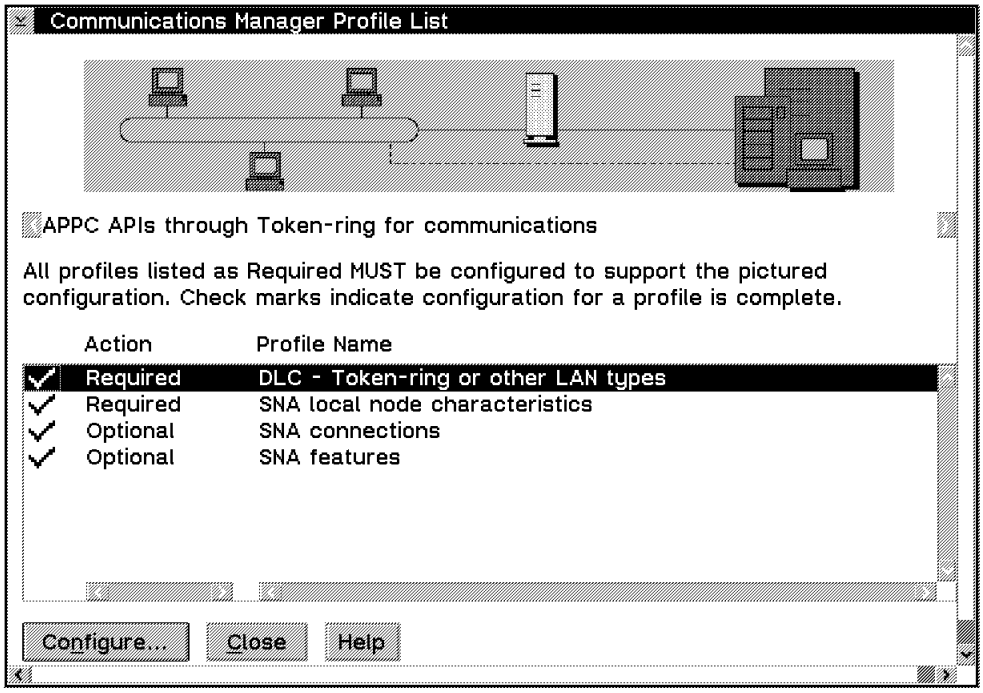

Figure 28. Communication Manager Profile List

Step 6 In the *Token-ring or other LAN types DLC Adapter Parameter* window (Figure 29 on page 42):

- Make sure that the *C&SM LAN ID* is **VTAM1**, the NETID value of the VTAM definitions on the VSE/ESA host (see Figure 88 on page 121)
- Press **OK**

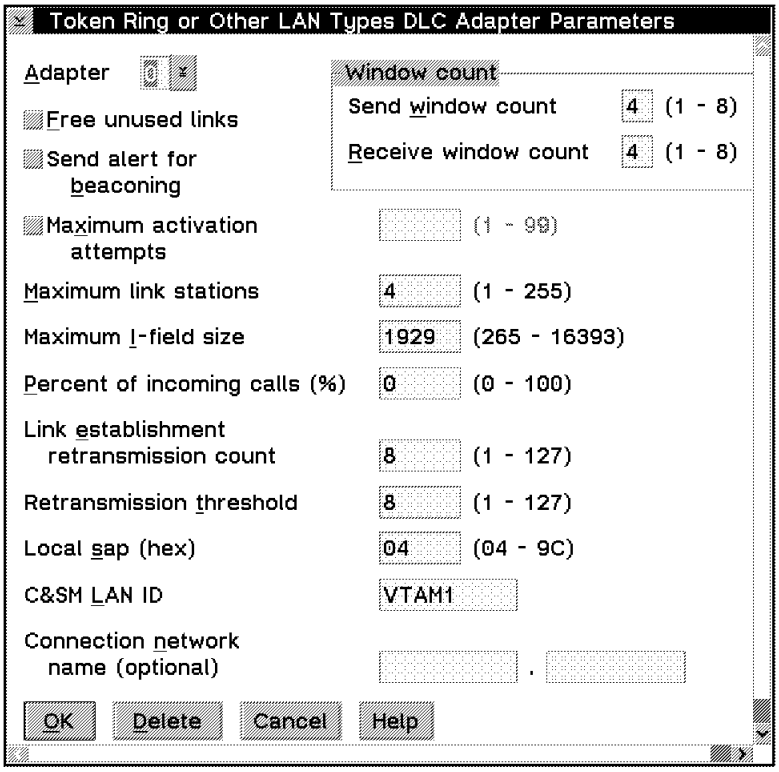

Figure 29. Token-Ring or Other LAN Types DLC Adapter Parameters

Step 7 The *Communications Manager Profile List* window comes back again (Figure 30):

- Select **SNA local node characteristics**
- Press **Configure**

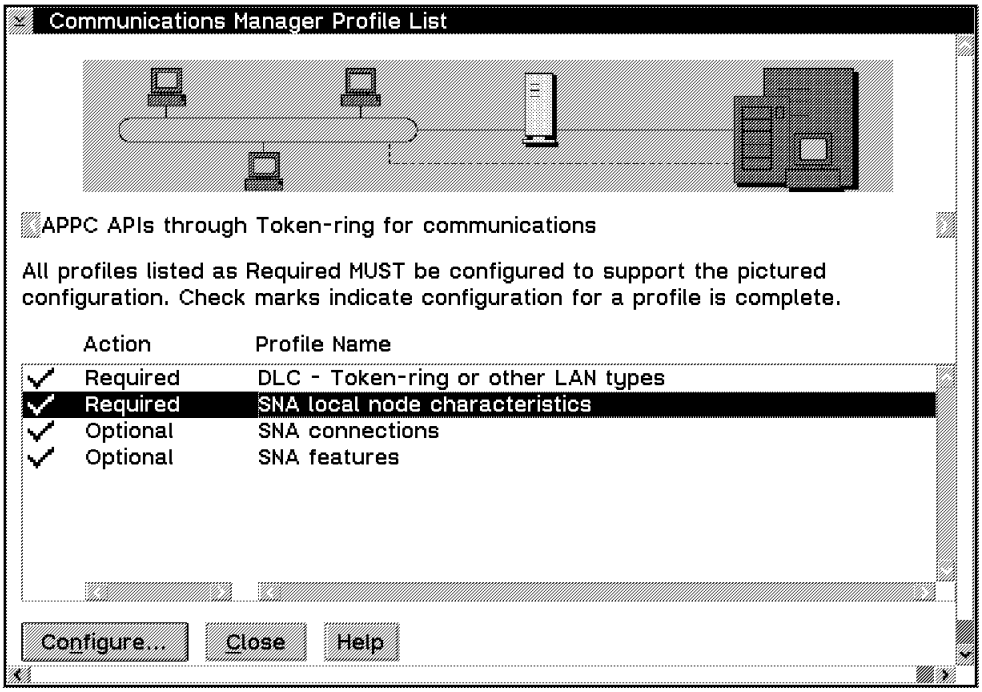

Figure 30. Communication Manager Profile List

Step 8 In the *Local Node Characteristics* window (Figure 31 on page 43):

- Make sure that Network ID and Local Node Name are filled in with **VTAM1** and **OS2LU2** and **End node - no network server** is selected
- *Local node ID (hex)*: we don't have to do anything about these two entry fields because we used the *CPNAME* to define the OS/2 server PU in VTAM (see Figure 17 on page 29). If you defined your OS/2 server PU in VTAM with *IDBLK* and *IDNUM* values, instead of *CPNAME*, you have to put these two values here
- Press **Options**

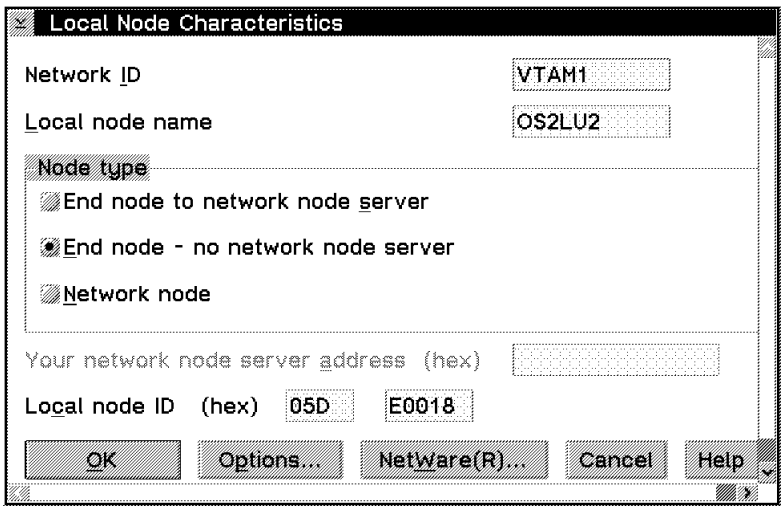

Figure 31. Local Node Characteristics

Step 9 In the *Local Node Options* window (Figure 32):

- Make sure that **Activate Attach Manager at start up** is selected
- Press **OK** to get the previous panel
- Press **OK** again to come back to the *Communication Manager Profile List* panel

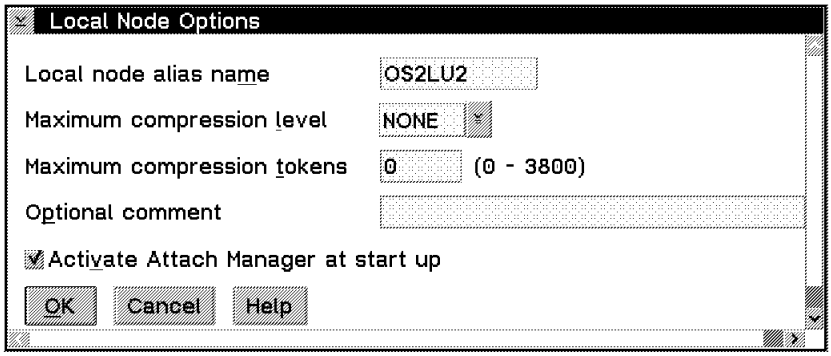

Figure 32. Local Node Options

Step 10 In this panel (Figure 33 on page 44):

- Select **SNA connections**
- Press **Configure**

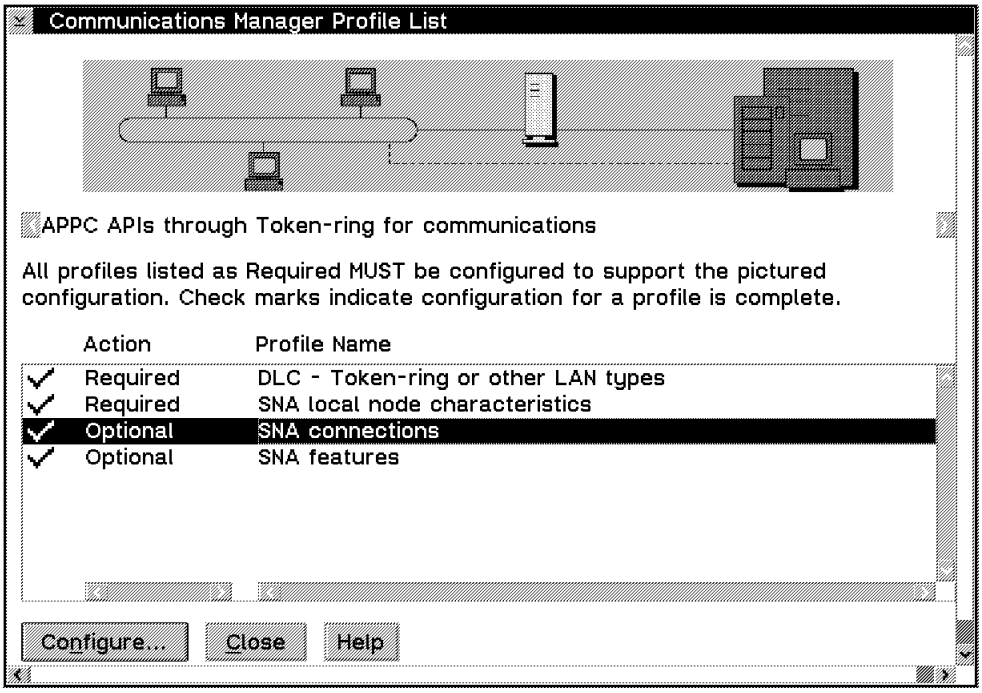

Figure 33. Communication Manager Profile List

Step 11 In the *Connections List* window (Figure 34):

- Select **To host** as *Partner type*
- Press **Create**

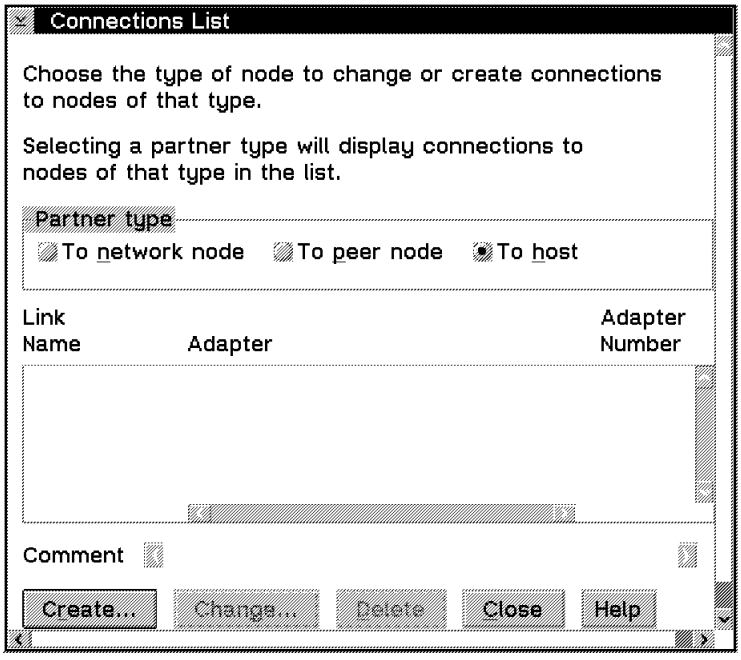

Figure 34. Connect List

Step 12 You receive the *Adapter List* window (Figure 35 on page 45):

- Select **Token-ring or other LAN types**
- Press **Continue**

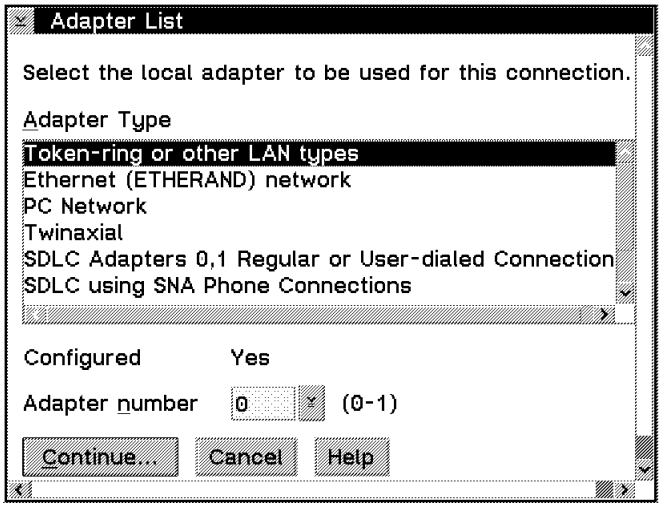

Figure 35. Adapter List

Step 13 In the *Connection to a Host* window (Figure 36 on page 46):

- Type the PU name **OS2PU2** from VTAM definitions in the *Local PU Name field* (see Figure 17 on page 29)
- Type **400020201002** in the *LAN destination address*. This must match the parameter MACADDR in the LAN Major Node definitions (Figure 21 on page 33). This is the address of the Token-Ring Integrated Communication Adapter. When we tested the IBM 3172 Interconnect Controller we had to change this definition to **400020201003**, the MACADDR of our IBM 3172 Interconnect Controller.
- Type **VSELRS1** in the *Partner node name*, from the Appl Major Node definition (see Figure 19 on page 31)
- Make sure **Activate at startup** is selected and *Partner network ID* is **VTAM1**
- Press **OK**
- Press **Close** when the panel *Connections List* is displayed.

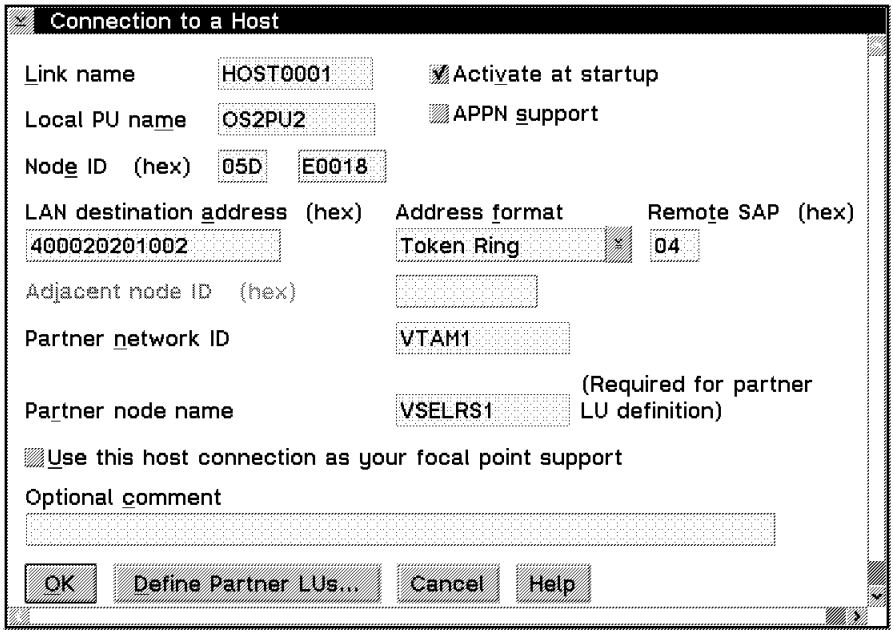

Figure 36. Connect to a Host

Step 14 The panel *Communications Manager Profile List* reappears (Figure 37):

- Select **SNA features**
- Press **Configure**

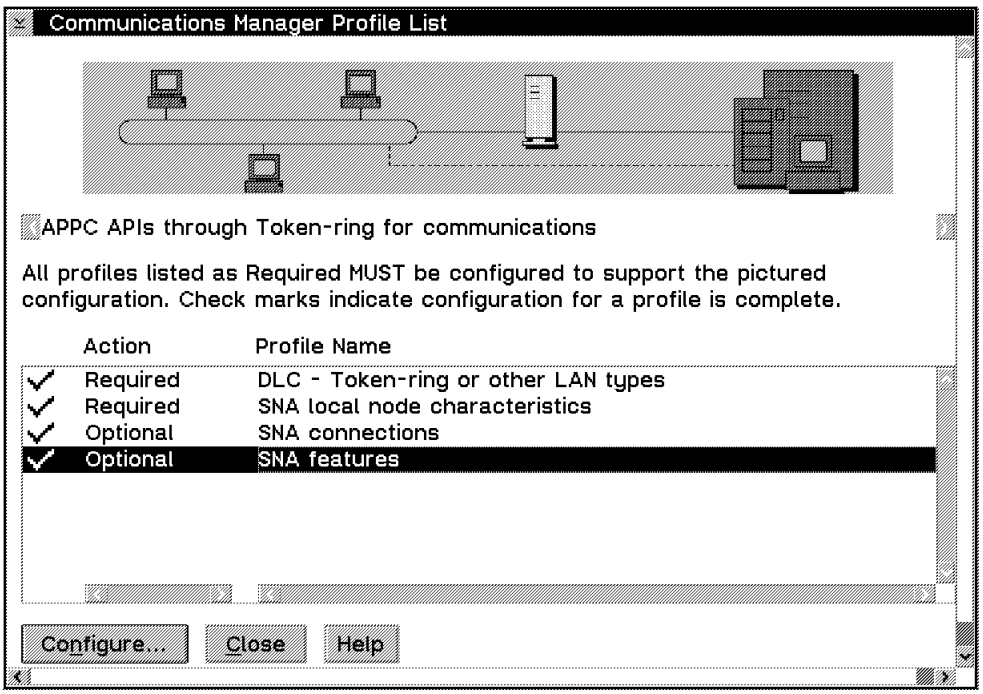

Figure 37. Communication Manager Profile List

Step 15 In the *SNA Features List* window (Figure 38 on page 47):

- Select **Modes** from the *Features* list and **#INTER** from the *Definition* list
- Press **Change**

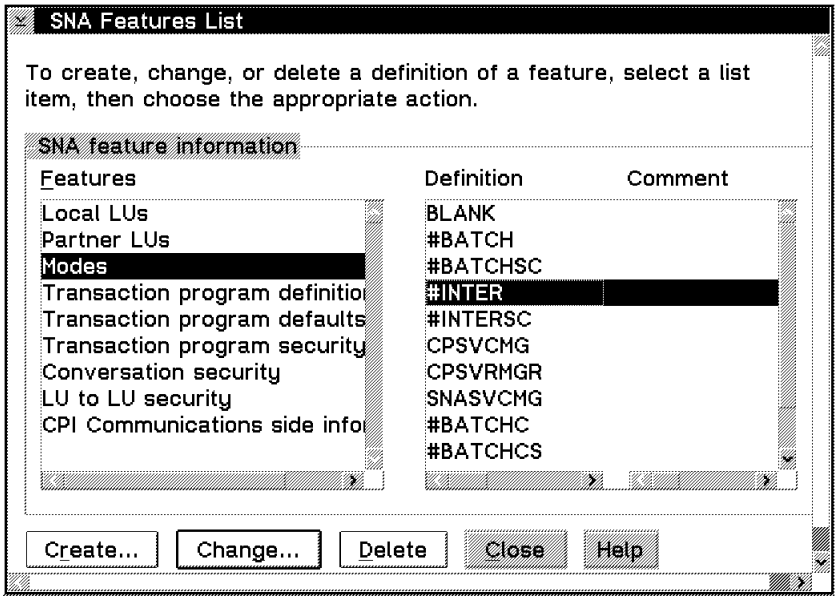

Figure 38. SNA Features List

Step 16 You get the *Mode Definition* window (Figure 39):

- Select **Maximum RU size**
- Specify **16384**. By specifying the largest RU size possible, LANRES will pick the RUSIZE specified in the VTAM LOGMODE table to be used for communication.
- Press **OK**

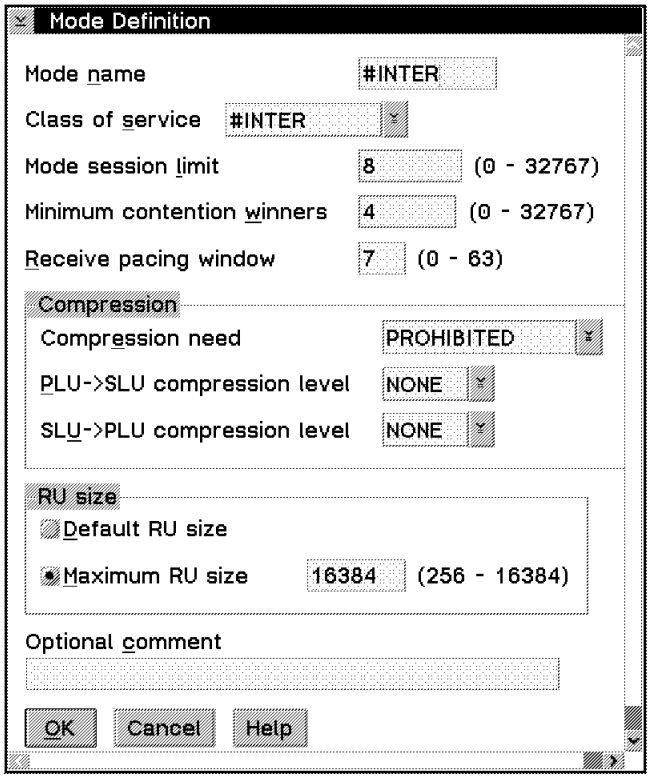

Figure 39. Mode Definition

Step 17 In the panel *SNA Features List* window (Figure 40 on page 48):

- Select **Transaction program definition**
- Press **Create**

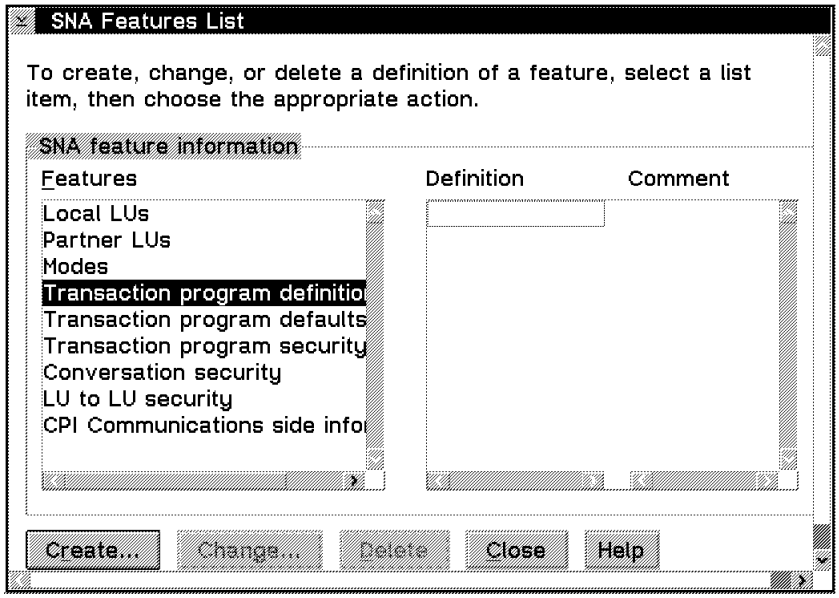

Figure 40. SNA Features List

Step 18 In the *Transaction Program Definition* window (Figure 41 on page 49):

- Type **EWXCOMM** in the *Transaction Program (TP) name* field

  Caution

  This entry is case sensitive. Make sure that you specify EWXCOMM in CAPITAL letters.

- Type **C:\LANRES\EWXCOMM.EXE** in the *OS/2 program path and file name* field
- Press **Continue**

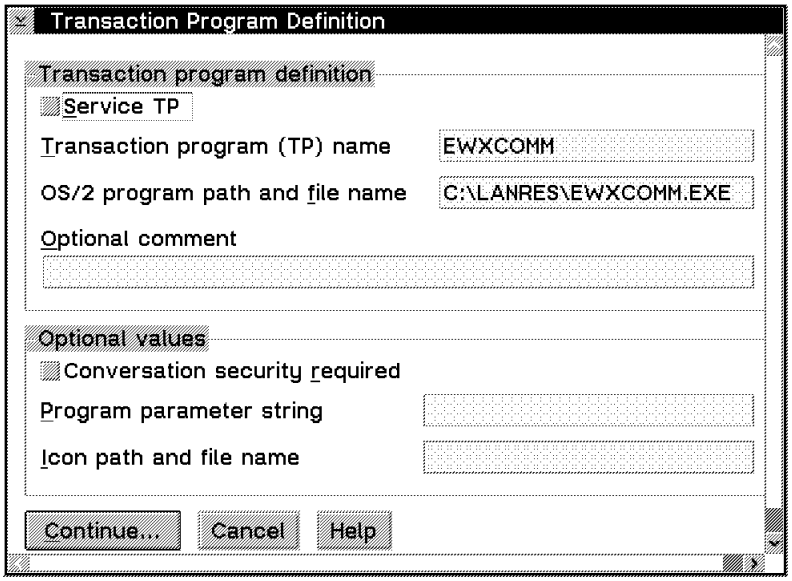

Figure 41. Transaction Program Definition

Step 19 In the *Additional TP Parameters* window (Figure 42):

- Select **Presentation Manager** as *Presentation type* and **Queued, operator started** as *Operation type*
- Press **OK**

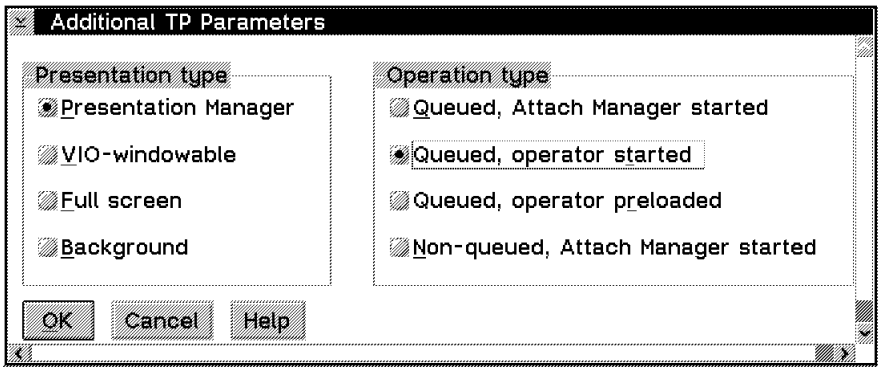

Figure 42. Additional TP Parameters

Now you exit from the Profile Definition by pressing **Close** in the next three panels.

Press **Yes** when asked to *Change the Default Configuration*.

Press **Yes** in the message *Communications Manager is complete*.

Press **Close** in the initial *Communications Manager Setup* panel.

You have now finished the setup of the Communications Manager/2 to communicate to VTAM using APPC connection.

4.2.2.2 Define the APPC Connection

At this point the SNA LU 6.2 APPC communication support is set up on both, the VSE/ESA system and the OS/2 server.
We now have to make some definitions on the OS/2 server within the LANRES communication to make use of the APPC connection.

1. Open the LANRES folder (Figure 22 on page 36) on the desktop of your OS/2 server.
2. Open the *Communication* icon as settings to get the Communications - Settings notebook shown in Figure 43.

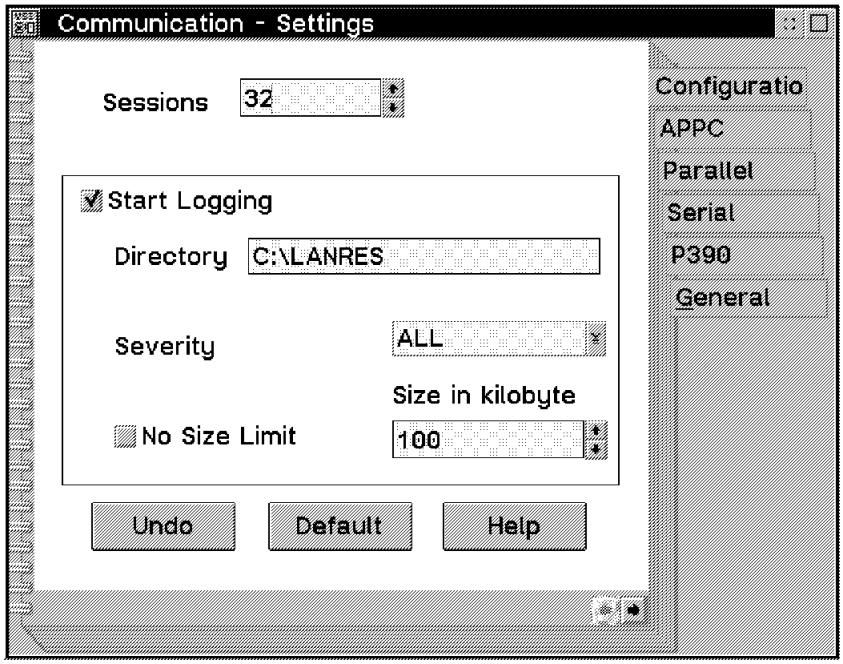

Figure 43. Initial Settings for Sessions and Logging

We changed the default number of sessions to 32, which was enough for our environment. We didn't make any other change. Certify that **Start Logging** is checked and the Directory is set to **C:\LANRES**, the directory where LANRES has been installed. This screen also asks that all LANRES/VSE messages be logged, with a size limit for the log file. If the keyword *Start Logging* is not checked, the messages will be displayed in the OS/2 window where **EWXCOMM** is running.

Once these settings are finished, you need to define the communication method, selecting the respective function in the same screen. We selected APPC (see Figure 44 on page 51).

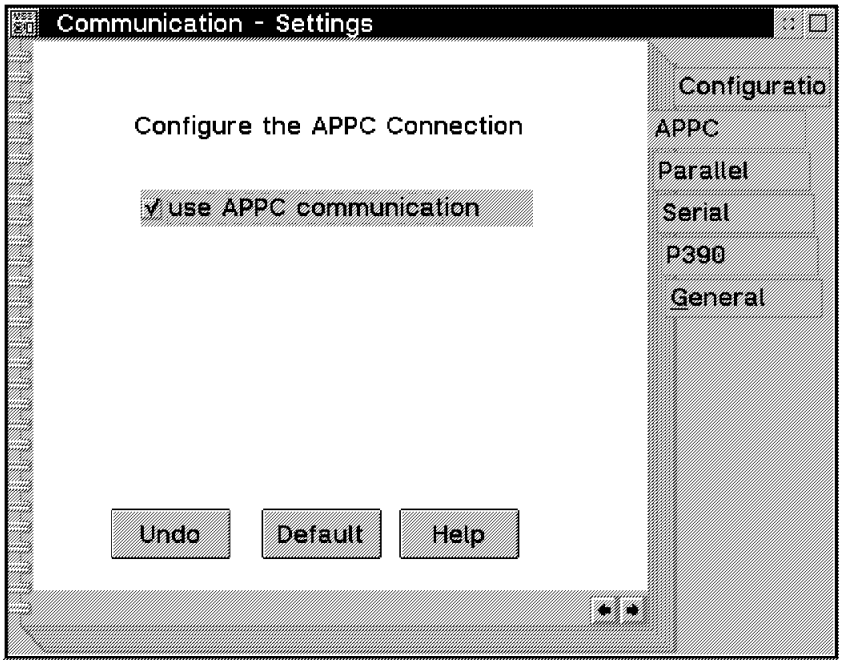

Figure 44. APPC Communication Setting

4.2.2.3 Start APPC Connection

At this point we are in a position to start up the communication to LANRES/VSE on the host.
This is done with the following sequence of commands:

1. Start the Communications Manager/2 using the Profile **LRSOS2** defined in the 4.2.2.1, “Customize Communications Manager/2 on the OS/2 Server for APPC” on page 40.
2. Start LANRES/VSE on the OS/2 server using the LANRES folder (Figure 22 on page 36). In order to do this double click the *Communications* icon inside that folder, or type **start ewxcomm** from an OS/2 server command line prompt.
3. Start the corresponding VSE/VTAM resources at the host side:
   a. When we used the IBM 3172 Interconnect Controller connection, we had to activate **LRSAPPL.B, LRSSWOS2.B, LRS3172.B** (see 3.2.2.2, “Start the IBM 3172 APPC Connection” on page 32).
   b. When we used the Token-Ring Integrated Communication Adapter connection, we had to activate **LRSAPPL.B, LRSSWOS2.B, LRSCETI.B** (see 3.2.3.2, “Start the Token-Ring ICA APPC Connection” on page 34).
   c. Release job **LRSAPPC** to start the VSE/ESA APPC server (see 3.2.2.2, “Start the IBM 3172 APPC Connection” on page 32 or 3.2.3.2, “Start the Token-Ring ICA APPC Connection” on page 34).

Chapter 5. Running LANRES/VSE

5.1 Starting and Stopping LANRES/VSE Applications

After having completed the setup work for both, LANRES/VSE on the host and on the OS/2 server we are now able to start the actual LANRES/VSE applications.

Note

Before starting the LANRES/VSE applications, you can change the startup options for each application. These startup options, for example the application passwords, can be specified via the OS/2 settings of each application icon in the LANRES folder.

Since LANRES installs on the OS/2 server with predefined application options, we didn′t have to change the LANRES application startup options.

If you do want to change the LANRES application settings, please refer to *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624 Chapter 5. Setting Up an OS/2 Server*.

The following instructions assume that the communication between LANRES/VSE on the host and LANRES/VSE on the OS/2 server has been started as described in 4.2, “Set Up the OS/2 Server for Communications” on page 36.

To start a LANRES/VSE application proceed as follows:

1. Start the application (*EWXxxxxx*) on the OS/2 server, where xxxxx = DISK, DIST, LHPRT, HLPRT, depending on the application functions you want to use. See Chapter 1, “LANRES/VSE Overview” on page 3 for a short description of the individual applications.
2. Start the corresponding LANRES/VSE job on the host side.

The VSE job triggers the connection to the OS/2 server and issues messages on the VSE/ESA console. Depending on its nature, the LANRES/VSE application terminates after having performed all LANRES commands or remains active as a continuously running application server.
Remember that LANRES/VSE is started using a REXX/VSE procedure that is called from a VSE batch job; for details refer to *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624*.

1. The Distribution and Administration application (EWXDIST) terminates after processing the LANRES commands specified in the REXX/VSE procedure.

   On the VSE/ESA side no particular action is required to terminate the LANRES Distribution and Administration application, EWXDIST. This means that the jobs terminate and the corresponding partition issues the standard ″WAITING FOR WORK″ message.

Note

If the Distribution and Administration application doesn't terminate correctly, make sure that the *EWXCONN DROP* command has been specified in the corresponding REXX/VSE procedure.

On the OS/2 server side you don't have to stop the EWXDIST application, unless you don't want to use it again in the near future. In this case we recommend to stop the application to save OS/2 server resources.

2. These applications run as 'never ending' application servers after having been started via REXX/VSE procedures:

   a. EWXDISK : LANRES/VSE Disk Serving

   b. EWXHLPRT: LANRES/VSE Host-to-LAN Printing

   c. EWXLHPRT: LANRES/VSE LAN-to-Host Printing

   On the VSE/ESA side these applications have to be terminated explicitly. This is even true if the connection to the OS/2 server cannot be established, for example, when the corresponding OS/2 server application was not started. The LANRES/VSE application will try again to connect after a certain time interval, which can be specified via the RETRY parameter in the corresponding REXX/VSE procedure.
   The LAN-to-Host Printing and Host-to-LAN Printing applications can be explicitly terminated using the '*MSG xx DATA=STOP*' command where 'xx' is the partition-id in which the LANRES/VSE application has been started.

   Prior to stopping the LANRES disk server on the VSE/ESA, you should always close the Disk Serving application (EWXDISK.EXE) on the OS/2 server. Otherwise, the OS/2 server might not be able to write cached data to the VSE/ESA LANRES disks and thereby lose it.

   On the OS/2 server side, if you stop the corresponding function, the continuously running applications will be 'disturbed' since they lose connection to the OS/2 server. As mentioned before, an attempt is made to re-establish communication depending on the RETRY parameter specification.

   Note

   Before terminating the Disk Serving application, make sure that the LAN users close all files on the disk images accessed by the disk server. Otherwise data on these disks may be lost.

Examples of job streams for starting and controlling the individual LANRES/VSE applications will be provided in Part 3, "Using LANRES/VSE" on page 55.

Part 3. Using LANRES/VSE

This part provides examples of how to use the functions and facilities provided by LANRES/VSE.

The examples shown in subsequent chapters assume that the LANRES/VSE components on the host and the OS/2 server **are ready to connect to each other**. This means, that LANRES Communication (EWXCOMM) has been successfully started on the server side (see Figure 22 on page 36).

We used VSE/ICCF for editing our jobs. Other alternatives are to use the Distributed Workstation Feature (DWF) of VSE or use the new VSE/ESA DITTO editing function.

Before we describe the different LANRES applications let us look at some general rules and hints regarding the REXX procedures required for starting LANRES/VSE.

- Do not use *EWXVSE2('...')*, but *CALL EWXVSE2('..')* or *RC=EWXVSE2('..')*.
- Do not specify *'/* */'* starting in column one if you are using the ICCF editor.
- LANRES/VSE command options *must* begin with a left parenthesis. A blank *must* precede and follow the left parenthesis. You can also indicate their end with an optional right parenthesis. If you are using the right parenthesis, a blank *must* precede it.
- When you check the result of a command using *RC=EWXVSE2('..')*, a value of *'0'* indicates that everything was successful, a value of *'8'* means that an error occurred.
- For testing purposes use the LANRES *DEBUG* option, by specifying *'DEBUG 255'* in the REXX procedure that starts the LANRES/VSE application. This increases the VSE/ESA console output when the application is started.
- This is how error handling can be done (the following examples are part of the Distribution and Administration sample REXX procedure shown in Figure 62 on page 76).

  At the very beginning of the REXX procedure, we had

```
SIGNAL ON ERROR
SIGNAL ON SYNTAX
```

  to jump to the error handling section whenever an error (RC <> 0 or REXX syntax error) occurs. The error handling section is usually at the end of the REXX procedure and should include an "EWXCONN DROP" LANRES command to make sure that the established connection is freed when the REXX procedure ends abnormally. This is how it could look:

```
/*****************************************************************/
/* Error handling                                                */
/*****************************************************************/
ERROR:
SYNTAX:
SAY '----->>> BAD RETURNCODE 'rc' received from command:'
SAY '----->>>       'sourceline(sigl)
SAY '----->>> at line 'sigl
SAY '----->>>'
```

```
SAY †---->>> RECOVERY IN PROGRESS ...†

RC=EWXVSE2(¢EWXCONN DROP¢)

SAY ¢==========>>>>>>>>>>>>>>>> DROP RETURNS¢ RC

EXIT 99
```

- To get the output of an OS/2 command issued from VSE/ESA with the LANRES command EWXOS2, you have to check the contents of the LANRES stem variable LANRES_RESULTS.n. To display the OS/2 command output, the REXX procedure could include parts like this:

```
/*************************************************************/
/* Create the home directory for the user LANRES.            */
/*************************************************************/
RC=EWXVSE2(¢EWXOS2 MD D:\USERDISK\LANRES¢)
CALL lroutput

/*************************************************************/
/*    WRITE LANRES-OUTPUT to console                         */
/*************************************************************/
LROUTPUT:

x=LANRES_RESULTS.0

if (x<>¢LANRES_RESULTS.0¢) then
  do i=1 to x
    say lanres_results.i
  end
else say ¢====>>> BAD STEM¢

RETURN
```

You will find further details and REXX sample procedures in the following chapters.

Chapter 6. How to Use LANRES/VSE Disk Serving

The LANRES/VSE Disk Serving application (EWXDISK) provides VSE/ESA owned DASD space for the OS/2 server as if it was local server hard disk space.

From an OS/2 LAN client point of view this disk serving capability is totally transparent. For the clients there is no difference whether their data resides on their own local hard disks, OS/2 server disks or LANRES/VSE disks on the mainframe.

Note

Before starting the disk serving you can modify its startup options via the OS/2 settings notebook of the Disk Serving application icon in the LANRES folder. If you want to change the initial disk serving settings for security or disk caching, please refer to *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624 Chapter 5. Setting Up an OS/2 Server: To Cache or Not to Cache?*.

This is what we had to do to prepare for and start up LANRES/VSE Disk Serving:

1. Create and initialize VSE/VSAM RRDS files which represent OS/2 server disk images using the *EWXLDCRT* command.
2. Ensure that LANRES/VSE communications (EWXCOMM.EXE) has been started on the OS/2 servers. If you are using an APPC connection, then additionally the APPC server program on VSE has to be up and running in a separate partition.
3. Start the LANRES disk application at the OS/2 server.
4. Start the LANRES/VSE Disk Server on the host.
5. Format new disk image(s) on the OS/2 server.
6. Access the disk image(s) from an OS/2 LAN client.

Once a particular disk has been made available to the OS/2 server, only steps 2, 3, 4 and 6 need to be repeated if the OS/2 server was shut down and reconnects again to LANRES/VSE after startup.

Caution

Data on LANRES disk images can be lost or the whole disk image might become corrupted if connection problems between VSE/ESA and the OS/2 LANRES server occur. This is why you should **back up the LANRES disks** on a regular basis (see 6.8, “Backing Up LANRES Disks” on page 65).

6.1 Create and Initialize a LANRES/VSE OS/2 Server Disk Image

The LANRES/VSE command *EWXLDCRT* is used to create and initialize a VSE/VSAM RRDS file that will be used as a disk image for LANRES/VSE disk serving.
Note that the resulting VSAM RRDS data set **cannot be used from VSE/ESA**, since it is formatted and used in a way which makes it only usable for the OS/2 server.

We used the LANRES/VSE provided sample job EWXLDCRT.Z and changed it according to our needs as shown in Figure 45 on page 58. The job listed in Figure 46 on page 59 will execute this REXX procedure.

```
* $$ JOB JNM=LDCRT,CLASS=C,DISP=D
* $$ LST CLASS=A,DISP=D
// JOB LDCRT    CATALOG THE REXX/VSE PROCEDURE EWXLDCRT.PROC
// EXEC LIBR
   ACC S=PRD2.LANAPPL
   CATALOG EWXLDCRT.PROC  EOD=XY REP=YES
 DISK_IMAGE_NAME = ¢ITSODASD¢   /* NAME OF THE DISK IMAGE          */
 DISK_IMAGE_SIZE = ¢50M¢         /* SIZE OF THE DISK IMAGE         */
                                /*  has to be between 2M and 2G   */
 catalog = ¢VSESPUC¢            /* Catalog to hold the disk image */
 volumes = ¢DOSRES SYSWK1¢      /* Volumes which should hold the  */
                                /* disk image                     */

 primalloc = ¢25M¢              /* Primary allocation of the disk */
                                /* image                          */
 secalloc = ¢25M¢               /* Secondary allocation of the    */
                                /* disk image                     */

 rc=EWXVSE2(¢EWXLDCRT ¢disk_image_name disk_image_size catalog volumes,
           ¢( PR ¢ primalloc ¢SEC¢ secalloc )

 exit(rc)
XY
/*
/&
* $$ EOJ
```

Figure 45. REXX Procedure for Creating a LANRES/VSE OS/2 server Disk Image

This job catalogs the REXX procedure EWXLDCRT.PROC in sublibrary PRD2.LANAPPL. The disk name is *ITSODASD*. It has a size of 50 Megabytes and will be created in VSE/VSAM catalog *VSESPUC* residing on VSE volume *DOSRES*. EWXLDCRT creates a VSAM RRDS file and initializes it.

Warning

Depending on the size of the disk image you create with EWXLDCRT, it may take quite some time before the corresponding job finishes.

It took a few minutes to create a disk image of the size of 50MB on our system.

Refer to the corresponding LANRES/VSE command description in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624* for more details on the EWXLDCRT command.

```
* $$ JOB JNM=EWXLDCRT,CLASS=5,DISP=L
* $$ LST CLASS=A,DISP=D
// JOB EWXLDCRT    CALL THE REXX PROCEDURE
// LIBDEF *,SEARCH=(PRD2.LANAPPL,PRD2.LANRES)
// EXEC REXX=EWXLDCRT
/*
/&
* $$ EOJ
```

Figure 46. Create a LANRES/VSE OS/2 Server Disk Image

The job above produced the following output (Figure 47).

```
C1 0001 1Q47I   C1 LDCRT 01010 FROM (SYSA) , TIME=12:08:23
C1 0045 // JOB LDCRT   CATALOG THE REXX/VSE PROCEDURE EWXLDCRT.PROC
        DATE 12/07/96,CLOCK 12/08/23
C1 0045 EOJ LDCRT     MAX.RETURN CODE=0000
        DATE 12/07/96,CLOCK 12/08/23,DURATION   00/00/00
C1 0001 1Q3EI  DYNAMIC CLASS ¢C¢ WAITING FOR WORK
F5 0001 1Q47I   F5 EWXLDCRT 01011 FROM (SYSA) , TIME=12:08:29
F5 0008 // JOB EWXLDCRT    CALL THE REXX PROCEDURE
        DATE 12/07/96,CLOCK 12/08/29
F5 0008 EWXDSK4269I THE DISK IMAGE WILL BE CREATED WITH A PRIMARY ALLOCATION
OF 10240 RECORDS  AND A SECONDARY ALLOCATION OF  10240 RECORDS.
F5 0008 EWXDSK4264I PLEASE BE PATIENT. CREATING AND INITIALIZING THE DISK
IMAGE LANRES.DISK.ITSODASD.
F5 0008 EWXDSK4263I  LANRES.DISK.ITSODASD WAS CREATED FOR 102400 BLOCKS.
F5 0008 EOJ EWXLDCRT  MAX.RETURN CODE=0000
        DATE 12/07/96,CLOCK 12/12/45,DURATION   00/03/10
F5 0001 1Q34I   F5 WAITING FOR WORK
```

Figure 47. Console Output Example for LANRES/VSE Disk Image Creation

The duration of the creation process depends, as mentioned above, on the size of the disk image to be created.

6.2 Start LANRES Disk Serving on the OS/2 Server

Assuming that LANRES communication has already been successfully started on the OS/2 server, we can start the Disk Serving function through its icon in the LANRES folder or by entering a **START EWXDISK** command on an OS/2 command line prompt.

Refer to the corresponding LANRES/VSE command description in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624* for more details on the START EWXDISK command.

6.3 Start the LANRES/VSE Disk Server on the Host

We proceed in the same way as we did in 6.1, “Create and Initialize a LANRES/VSE OS/2 Server Disk Image” on page 57: First we create a job to catalog a REXX procedure containing the LANRES/VSE command EWXLDDSK, then we execute this REXX procedure in another job (EWXLDDSK).

1. We used the LANRES/VSE sample REXX procedure for starting the LANRES/VSE disk server EWXLDDSK.Z and changed it according to our needs (Figure 48 on page 60).

```
* $$ JOB JNM=LDDSK,CLASS=C,DISP=D
* $$ LST CLASS=A,DISP=D
// JOB LDDSK    CATALOG THE REXX/VSE PROCEDURE EWXLDDSK.PROC
// EXEC LIBR
   ACC S=PRD2.LANAPPL
   CATALOG EWXLDDSK.PROC EOD=XY REP=YES
 /*****************************************************************/
 /* Specify the following values according to your needs          */
 /*****************************************************************/
 DISK_IMAGE_NAME = ¢ITSODASD¢   /* NAME OF THE DISK IMAGE         */

 comm_protocol = ¢APPC¢         /* Specify either APPC or CHANNEL */
 if comm_protocol = ¢APPC¢ then
    TARGET = ¢OS2LU2¢           /* LU NAME OF THE SERVER          */
 else
    target = ¢940¢              /* Channel address                */

 pwin = ¢UP¢                    /* Specify a component password   */
 pwout = ¢DOWN¢                 /* Specify a component password   */

 /*****************************************************************/
 /* Start the disk server                                         */
 /*****************************************************************/
 rc=EWXVSE2(¢EWXLDDSK ¢disk_image_name ¢( ¢ comm_protocol target,
    ¢ PWIN ¢ pwin ¢ PWOUT ¢ pwout )
 exit(rc)
XY
/*
/&
* $$ EOJ
```

Figure 48. REXX Procedure for Starting the LANRES/VSE Disk Server

2. We ran a job to execute this REXX procedure which starts the LANRES/VSE Disk Server (Figure 49).

```
* $$ JOB JNM=EWXLDDSK,CLASS=5,DISP=L
// JOB EWXLDDSK                CALL THE REXX PROCEDURE
// LIBDEF *,SEARCH=(PRD2.LANAPPL,PRD2.LANRES,PRD2.PROD,PRD1.BASE)
/. X Specify either CHANNEL or APPC
// SETPARM COMM=APPC
// IF COMM=CHANNEL THEN
// SETPFIX LIMIT=16K
// EXEC REXX=EWXLDDSK
/*
/&
* $$ EOJ
```

Figure 49. Starting the LANRES/VSE Disk Server

This is the VSE/ESA console output we received from LDDSK and EWXLDDSK (Figure 50 on page 61):

```
C1 0001 1Q47I   C1 LDDSK 01014 FROM (CSP1) , TIME=14:47:45
C1 0045 // JOB LDDSK   CATALOG THE REXX/VSE PROCEDURE EWXLDDSK.PROC
        DATE 12/07/96,CLOCK 14/47/45
C1 0045 EOJ LDDSK     MAX.RETURN CODE=0000
        DATE 12/07/96,CLOCK 14/47/46,DURATION   00/00/00
C1 0001 1Q3EI  DYNAMIC CLASS ¢C¢ WAITING FOR WORK
R RDR,EWXLDDSK
AR 0015 1C39I COMMAND PASSED TO VSE/POWER
F1 0001 1R88I  OK
F5 0001 1Q47I   F5 EWXLDDSK 01016 FROM (CSP1) , TIME=15:11:27
F5 0008 // JOB EWXLDDSK               CALL THE REXX PROCEDURE
        DATE 12/07/96,CLOCK 15/11/27
F5 0008 EWXDSK1618I DISK SERVER REL. 2 MOD. 0 SERV. LEVEL 0 HAS BEEN STARTED.
F5 0008 EWXDSK4054I APPC CONNECTION THROUGH PC_SERVER ESTABLISHED TO DISK
FUNCTION.
F5 0008 EWXDSK4012I CONNECTION ESTABLISHED TO THE DISK FUNCTION ON THE SERVER.
```

Figure 50. LANRES/VSE Host Disk Serving Startup Messages

On the OS/2 server, we opened the **Status Information** icon in the LANRES folder as *Connection Info* to verify that the Disk Serving function has been started (Figure 51).

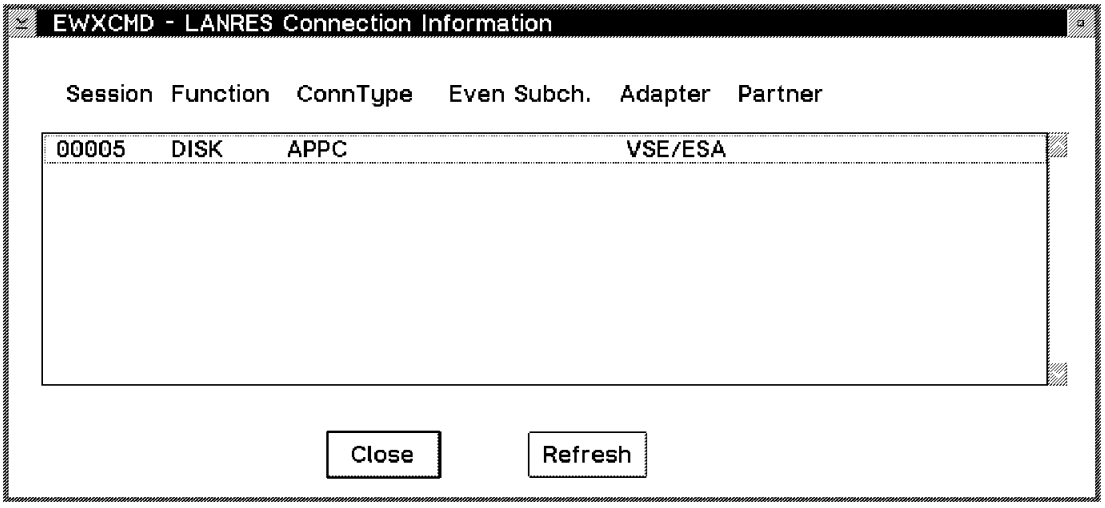

Figure 51. EWXCMD-LANRES Connection Information

To display information about the disk images that are now attached as OS/2 drives, we selected *Disk Info* from the pop-up menu of the **Status Information** icon. On our OS/2 server, we get the window shown in Figure 52 on page 62.

You can also enter a **START EWXINFO** command in an OS/2 command line window to get the *EWXINFO-LANRES Disk Information* window.

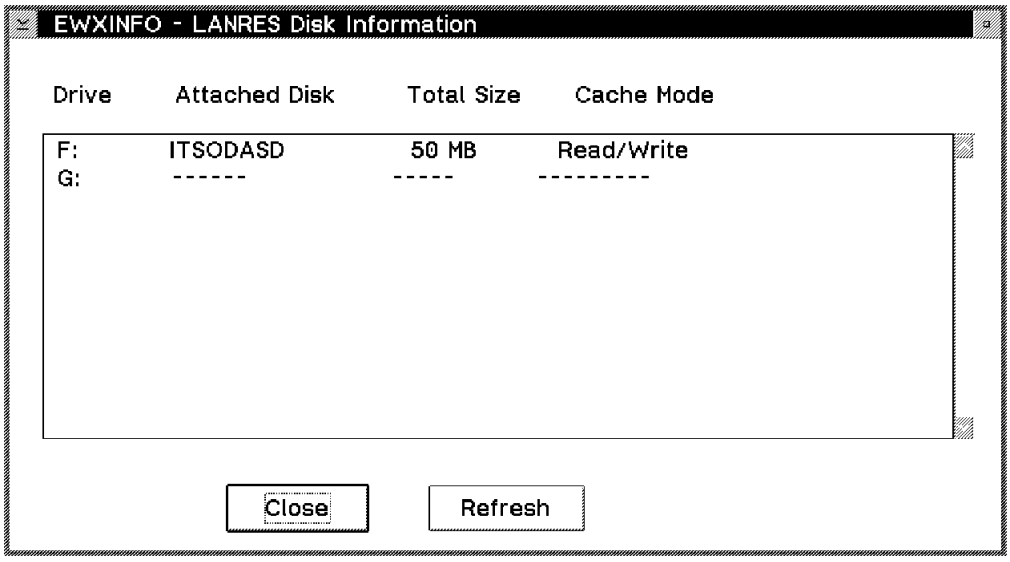

Figure 52. EWXINFO-LANRES Disk Information

6.4 Initializing the Disk Image(s) on the OS/2 LAN Server

This is the last step in making disk images available to the OS/2 server. ″Initializing″ means that you need to format the disk images before you can copy data to these disks. This could be done in either of two ways:

- Format the disk image from an OS/2 window
- Use LANRES Distribution Function from the VSE side

Since the disk images need to be formatted only once, we recommend to use the first option (Figure 53).

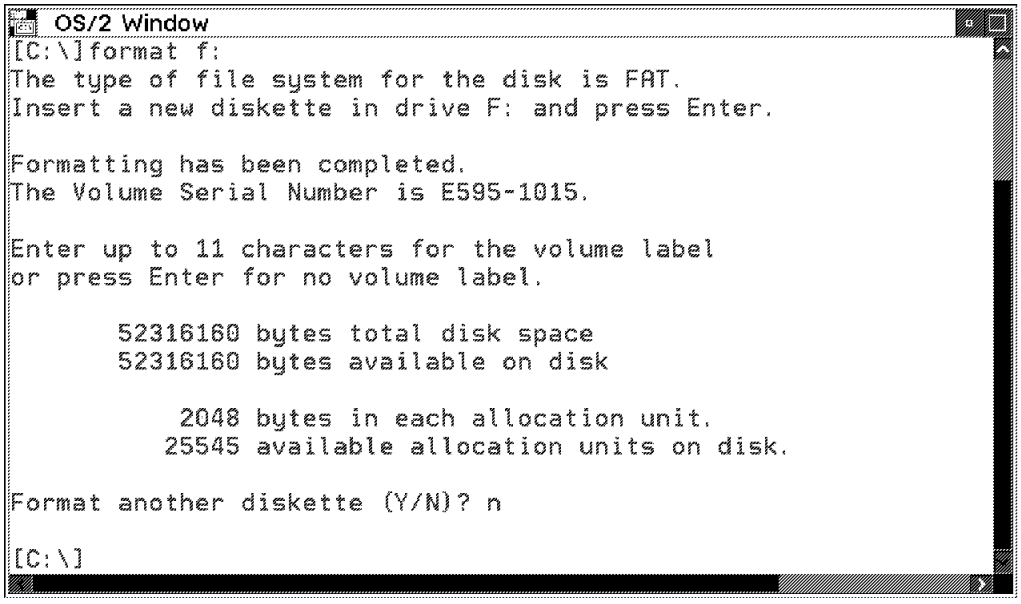

Figure 53. OS/2 Window: Formatting Disk Image

This disk image will be available as soon as you start the LANRES Disk Serving function on both, the host and the OS/2 server sides.

Note

One single disk image cannot exceed 2GB in size. We experienced that for disk images larger than 1GB, we had to apply the PTF IM00031 to be able to format these disk images.

6.5 Accessing Disk Image(s) from OS/2 LAN Clients

A LANRES/VSE disk image can be used by the clients in the same way as OS/2 server disks. That means the OS/2 LAN administrator has to define the LANRES/VSE disk image as a LAN resource to the clients. By creating an access control profile for the LAN resource, the administrator can restrict the VSE disk image to specific LAN users.

Access to these OS/2 server drives from an OS/2 LAN client can be restricted by the OS/2 server administrator in the same way as it can be done for any other physical disk which is controlled and managed by the server.

In our OS/2 LAN environment, we did the following:

1. Define the LANRES/VSE disk image as a LAN resource
   a. We logged on to our OS/2 LAN server domain as an administrator
   b. We used the graphical interface of the OS/2 LAN server to define the VSE disk image as a LAN resource with the alias name **ITSODASD** and access rights for our LAN users.
      You can also use the command line interface (NET commands) in an OS/2 window or issued from VSE/ESA via LANRES/VSE EWXOS2 commands to define the LAN resource and grant access rights to the LAN users.
2. Attach the LAN resource to the OS/2 LAN client
   a. We logged on with an OS/2 LAN user ID which has been given access rights to our alias ITSODASD
   b. In an OS/2 window, we entered the following command to use the LAN resource ITSODASD, located on our LAN server BOEITSS1, as drive X: on our OS/2 LAN client system:

      ```
      NET USE X: \\BOEITSS1\ITSODASD
      ```

For details about how to define disk images to an OS/2 LAN client, refer to the corresponding chapter in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624*.

6.6 Terminating LANRES/VSE Disk Serving

Ensure that OS/2 LAN clients close all files and are not accessing any file on the LANRES/VSE disk images. To stop the disk serving on the OS/2 server, you can use the **EWXDISK STOP** command, or close the OS/2 window where EWXDISK is running. To stop it on VSE/ESA, we issued the following command from the VSE/ESA system console:

```
MSG F5,DATA=STOP
```

F5 is the partition where the disk serving is running on our VSE/ESA system.

Note

When you terminate the disk serving for MMC connection, the following message may appear on the VSE console. **This is not an error and can be ignored.**

```
F5 0008 EWXDSK1610I DISK SERVER SHUTTING DOWN PER REQUEST.
AR 0014 0P27I I  UNKNWN DEV SYSXXX=940
        CCSW=000000000006000000 CCB=000000
        SNS=41
F5 0008 EWXDSK4046I DROPPING CHANNEL CONNECTION THROUGH PC_SERVER TO DISK
FUNCTION.
```

6.7 Deleting Disk Images

This function will destroy all OS/2 data on the disk image.

Ensure that the disk image is no longer available through any disk server. Remove references to the disk image from all disk image definition files.

We proceed in the same way as we did in 6.1, “Create and Initialize a LANRES/VSE OS/2 Server Disk Image” on page 57: First we create a job (LDDLT) to catalog a REXX procedure for the LANRES/VSE command EWXLDDLT, then we execute this REXX procedure in another job (EWXLDDLT).

1. Create a REXX Procedure for deleting the LANRES/VSE Disk Image (Figure 54).

```
* $$ JOB JNM=LDDLT,CLASS=C,DISP=D
* $$ LST CLASS=A,DISP=D
// JOB EWXLDDLT    CATALOG THE REXX/VSE PROCEDURE EWXLDDLT.PROC
// EXEC LIBR
   ACC S=PRD2.LANAPPL
   CATALOG EWXLDDLT.PROC EOD=XY REP=YES
 /*************************************************************/
 /* Specify the folLOWING VALUES ACCORDING TO YOUR NEEDS      */
 /*************************************************************/
 DISK_IMAGE_NAME = ¢ITSODASD¢   /* NAME OF THE DISK IMAGE      */

 /*************************************************************/
 /* Delete the disk IMAGE                                     */
 /*************************************************************/
 rc=EWXVSE2(¢EWXLDDLT ¢DISK_IMAGE_NAME )
 exit(rc)
XY
/*
/&
* $$ EOJ
```

Figure 54. REXX Procedure for Deleting the LANRES/VSE Disk Image

2. Execute the REXX Procedure for deleting the LANRES/VSE Disk Image (Figure 55 on page 65).

```
* $$ JOB JNM=EWXLDDLT,CLASS=5,DISP=D
* $$ LST CLASS=A,DISP=D
// JOB EWXLDDLT    CALL THE REXX PROCEDURE
// LIBDEF *,SEARCH=(PRD2.LANAPPL,PRD2.LANRES)
// EXEC REXX=EWXLDDLT
/*
/&
* $$ EOJ
```

Figure 55. Deleting the LANRES/VSE Disk Image

This is the VSE/ESA console output we received from LDDLT and EWXLDDLT (Figure 56):

```
C1 0001 1Q47I   C1 LDDLT 01094 FROM (CSP1) , TIME=15:37:08
C1 0045 // JOB LDDLT   CATALOG THE REXX/VSE PROCEDURE EWXLDDLT.PROC
        DATE 12/11/96,CLOCK 15/37/08
C1 0045 EOJ LDDLT     MAX.RETURN CODE=0000
        DATE 12/11/96,CLOCK 15/37/09,DURATION   00/00/00
C1 0001 1Q3EI  DYNAMIC CLASS ¢C¢ WAITING FOR WORK
F5 0001 1Q47I   F5 EWXLDDLT 01095 FROM (CSP1) , TIME=15:38:18
F5 0008 // JOB EWXLDDLT    CALL THE REXX PROCEDURE
        DATE 12/11/96,CLOCK 15/38/18
F5 0008 EWXDSK4258I LANRES.DISK.ITSODASD HAS BEEN DELETED.
F5 0008 EOJ EWXLDDLT  MAX.RETURN CODE=0000
        DATE 12/11/96,CLOCK 15/38/28,DURATION   00/00/09
F5 0001 1Q34I   F5 WAITING FOR WORK
```

Figure 56. LANRES/VSE Host Disk Image Delete Messages

6.8 Backing Up LANRES Disks

Since LANRES/VSE disk images are handled as single VSAM RRDS files, standard VSE/VSAM BACKUP/RESTORE utilities can be used to protect the data of the OS/2 server and clients.

The job listed in Figure 57 on page 66 shows how we backed up our LANRES disk ITSODASD to a TAPE (address 181). The job was created by the Interactive Interface (path 3713 from SYSA). Backing up to disk works the same way. Figure 58 on page 66 shows the job for the corresponding VSE/VSAM RESTORE which was created the same way as BACKUP (Path 3714 from SYSA).

More detailed instructions on using VSE/VSAM BACKUP/RESTORE for protecting OS/2 server and client data are contained in chapter ″Recovering an OS/2 File from a Backed Up VSE Disk Image″ in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624*.

```
* $$ JOB JNM=LRSBKUPT,DISP=D,PRI=3,
* $$ NTFY=YES,
* $$ LDEST=*,
* $$ CLASS=0
// JOB LRSBKUPT
// LIBDEF PHASE,SEARCH=IJSYSRS.SYSLIB
*  THIS JOB BACKS UP VSAM DATASETS
// DLBL IJSYSUC,¢VSESP.USER.CATALOG¢,,VSAM
*
* THIS FUNCTION USES A TAPE FOR OUTPUT
* MOUNT TAPE 111111 ON DEVICE 181
* THEN CONTINUE. IF NOT POSSIBLE CANCEL THIS JOB.
// PAUSE
// ASSGN SYS005,181
// EXEC IDCAMS,SIZE=AUTO
       BACKUP ( -
               LANRES.DISK.ITSODASD  -
              )  -
              UNLD -
              NOCOMPACT -
              BUFFERS(3)
/*
/&
*$$ EOJ
```

Figure 57. Saving OS/2 Server Data with the VSE/VSAM BACKUP Utility

```
* $$ JOB JNM=LRSRESTT,DISP=D,PRI=3,
* $$ NTFY=YES,
* $$ LDEST=*,
* $$ CLASS=0
// JOB LRSRESTT
// LIBDEF PHASE,SEARCH=IJSYSRS.SYSLIB
*  THIS JOB RESTORES VSAM DATASETS
*
* THIS FUNCTION USES A TAPE FOR INPUT
* MOUNT TAPE 111111 ON DEVICE 181
* THEN CONTINUE. IF NOT POSSIBLE CANCEL THIS JOB.
// PAUSE
// ASSGN SYS004,181
// EXEC IDCAMS,SIZE=AUTO
   RESTORE OBJECTS ( -
                   (LANRES.DISK.ITSODASD  -
                                                  ) -
                                                  ) -
      CATALOG(VSESP.USER.CATALOG) -
      UNLD -
      BUFFERS(3)
/*
/&
* $$ EOJ
```

Figure 58. Restoring OS/2 Server Data with the VSE/VSAM RESTORE Utility

Chapter 7. How to Use LANRES/VSE Distribution and Administration

The LANRES/VSE Distribution and Administration application (EWXDIST) provides the ability to work with OS/2 server files and directories from VSE/ESA, permitting you to copy files from VSE to an OS/2 server and vice versa.

Additionally, you can use OS/2 commands in REXX procedures, giving you the ability to administrate the LAN executing these OS/2 commands on the OS/2 server from your VSE/ESA system with the possibility to receive and display the command output on the host system.

Refer to chapter ″Distribution″ in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624* for a complete functional description of LANRES/VSE Distribution and Administration.

You have to prepare VSE/ESA REXX procedures according to the functions you want to execute.

Therefore, LANRES/VSE provides sample files, such as DSTSMPOS.Z, that are stored in the sublibrary used for installation. These sample files can be easily used and tailored according to your environment and the commands you want to execute.

We used three sample procedures available in the PRD2.LANRES, where we installed our LANRES/VSE

1. DSTSMPOS.Z executes a distribution function, getting a file from one server and distributing it to several servers.
2. EWXAUOS.Z executes an administration function, creating a new LAN user in the OS/2 server domain.
3. EWXDUOS.Z executes another administration function, deleting the previously created user from the OS/2 server domain.

7.1 Distribution Function

We punched the member **DSTSMPOS.Z** from our PRD2.LANRES sublibrary to an ICCF library, and modified it as in Figure 59 on page 69.

This sample procedure file executes the following functions:

1. Establish the connection to the LANRES source server
2. Copy a file from the source LAN server into a VSE/ESA sublibrary
3. Drop the connection
4. Establish a connection to the LANRES target server
5. If already existing, remove the target directory (including all contained files) from the target LAN server
6. Create a new target directory on the target LAN server
7. Copy the previously uploaded VSE/ESA sublibrary member to the target LAN server
8. Drop the connection

Before we cataloged this procedure, we set some variables, according to our environment:

- As the *source_server*, we specified our **BOEITSS1** server with user ID **ADMIN** and password **VMANDINO** which is connected via **APPC** as **OS2LU2**.
- We had one target LAN server, so we set *servers.0* to **1**.
- As the target server *servers.1*, we specified our **BOEITSS2** server with user ID **ADMIN2** and password **VMANDINO** which is connected via **APPC** as **ITSS2LU2**.
- Our target directory *target.1* was **D:\LANRES**.

```
* $$ JOB JNM=DISTOS2,CLASS=C,DISP=D
// JOB DISTOS2    CATALOG DISTOS2.PROC FOR START APPC DISTRIBUTION
// EXEC LIBR,PARM=¢MSHP¢
ACC S=PRD2.LANAPPL
CATALOG DISTOS2.PROC    REPLACE=YES
/* REXX ***************************************************************/
/*                                                                    */
/* COPYRIGHT -                                                        */
/*    5686-066 (C) COPYRIGHT IBM CORP. - 1996, 1996                   */
/*    LICENSED MATERIALS - PROPERTY OF IBM                            */
/*    SEE COPYRIGHT INSTRUCTIONS, G120-2083                           */
/*    ALL RIGHTS RESERVED.                                            */
/*                                                                    */
/* ROUTINE-NAME: DSTSMPOS.PROC                                        */
/*                                                                    */
/* DESCRIPTIVE-NAME: DSTSMPOS                                         */
/*                                                                    */
/* STATUS: LANRES/VSE for VSE/ESA Version 2.2.0                       */
/*                                                                    */
/* FUNCTION:                                                          */
/* This exec is an example of how to use the data distribution        */
/* function of LANRES. The exec will first copy (through EWXDS GET)   */
/* the server code to distribute throughout the network to host DASD. */
/* The next step will be to distribute the code from the host to      */
/* each server using the EWXDS PUT command.                          */
/*                                                                    */
/**********************************************************************/

/**********************************************************************/
/*                                                                    */
/* The servers. stem will hold the server information                 */
/* (servername/serveruserid serveruseridpassword (connection options) */
/* of the target server to receive the data.                          */
/*                                                                    */
/* The target.  stem will hold the target path name for the           */
/* distributed data.                                                  */
/*                                                                    */
/* To add more entries, increase servers.0 and add a servers.i stem   */
/* and target.i stem variable.                                        */
/*                                                                    */
/* The source_server variable contains the server and connection      */
/* information of the data to be distributed.                         */
/*                                                                    */
/* The data_to_get variable contains the name of the data to be       */
/* distributed.                                                       */
/*                                                                    */
/* The where_to_put variable contains the name of the file on the     */
/* host to temporarily hold the data                                  */
/*                                                                    */
/**********************************************************************/
```

Figure 59 (Part 1 of 5). DISTOS2.PROC, Copy from DSTSMPOS.Z

```
/*********************************************************************/
/* REXX output will be written to the console                        */
/*********************************************************************/
CALL ASSGN ¢STDOUT¢,¢SYSLOG¢

/*********************************************************************/
/* Error handling                                                    */
/*********************************************************************/
SIGNAL ON ERROR
SIGNAL ON SYNTAX

servers.0         = 1
servers.1         = ¢BOEITSS2\ADMIN2 VMANDINO  ( APPC ITSS2LU2¢
target.1          = ¢D:\LANRES¢
source_server     = ¢BOEITSS1\ADMIN VMANDINO  ( APPC OS2LU2¢

/*********************************************************************/
/* For this example, the data to distribute will be:                 */
/* C:\LANRES\EWXCOMM.EXE                                             */
/*********************************************************************/
data_to_get       = ¢C:\LANRES\EWXCOMM.EXE¢

/*********************************************************************/
/* For this example, the data to distribute will be put into the VSE */
/* sublibrary PRD2.LANRES                                            */
/*********************************************************************/
where_to_put_host = ¢PRD2.LANRES.EWXCOMM.EXEBIN¢

/*********************************************************************/
/* Perform LANRES LINK command.                                      */
/* Copy the data from the server to the host.                        */
/* Note the TYPE and REPLACE option was specified.                   */
/*                                                                   */
/*********************************************************************/
/*********************************************************************/
/* LANRES LINK to the server                                         */
/*********************************************************************/
  RC=EWXVSE2( ¢EWXCONN LINK DIST ¢ source_server )

  IF RC <> 0 THEN DO
    SAY ¢Link was unsuccessful. No processing was performed¢
    EXIT
  END
```

Figure 59 (Part 2 of 5). DISTOS2.PROC, Copy from DSTSMPOS.Z

```
/*********************************************************************/
/* Get the data from the server and put it on the host.              */
/*********************************************************************/

  RC=EWXVSE2( ¢EWXDS GET ¢ data_to_get where_to_put_host ¢( TYPE
              BINARY RECFM S REPLACE¢)


  If RC <> 0 Then Do
    SAY ¢The copying of data to the host was unsuccessful.          ¢
    SAY ¢No processing was performed.                               ¢
    EXIT
  End

/*********************************************************************/
/* Drop the connection to the server where the code  was obtained.   */
/*********************************************************************/
    RC=EWXVSE2( ¢EWXCONN DROP¢ )

/*********************************************************************/
/* Copy the data from the host to each server.                       */
/*********************************************************************/

/*********************************************************************/
/* Go through the loop until we have distributed the code to all the */
/* servers.                                                          */
/*********************************************************************/
DO I = 1 to servers.0

/*********************************************************************/
/* Link to the server we are distributing the code to.               */
/*********************************************************************/
  RC=EWXVSE2( ¢EWXCONN LINK DIST ¢ servers.i )

  IF RC <> 0 THEN DO
    SAY ¢Link was unsuccessful. No processing was performed¢
    EXIT
  END


/*********************************************************************/
/* Delete all files in target directory (if any exist).              */
/*********************************************************************/
  RC=EWXVSE2( ¢EWXOS2 DEL /n ¢target.i¢\*.* ¢)

/*********************************************************************/
/* Delete target directory (if it exists).                           */
/*********************************************************************/
  RC=EWXVSE2( ¢EWXOS2 RMDIR ¢target.i )
```

Figure 59 (Part 3 of 5). DISTOS2.PROC, Copy from DSTSMPOS.Z

```
/*********************************************************************/
/* Create the directory.                                             */
/*********************************************************************/
  RC=EWXVSE2( ¢EWXOS2 MKDIR ¢target.i )

IF LANRES_RESULTS.1 <> ¢LANRES_RESULTS.1¢ THEN DO
  SAY ¢If this step failed one of several things could have happened.  ¢
  SAY ¢We may/may not want to stop processing at this point.           ¢
  SAY ¢This exec will go no further because the exec assumes that if   ¢
  SAY ¢it failed here the most likely cause was there was a file in    ¢
  SAY ¢the target directory that was not able to be deleted and as     ¢
  SAY ¢result the directory was not able to be deleted, whereby        ¢
  SAY ¢manual intervention would be required. This exec will drop      ¢
  SAY ¢the connection to the server and exit.                          ¢
  RC=EWXVSE2( ¢EWXCONN DROP¢ )
  EXIT
END

/*********************************************************************/
/* Distribute the data from the host to the server                   */
/*********************************************************************/

/*********************************************************************/
/* Copy the data from the host to the server                         */
/*********************************************************************/
RC=EWXVSE2( ¢EWXDS PUT ¢where_to_put_host target.i¢\*.*¢ )


IF RC <> 0 Then Do
  SAY ¢The distribution of data to the server was unsuccessful.¢
  SAY ¢Processing will terminate. Please correct problem and resubmit.¢
  RC=EWXVSE2( ¢EWXCONN DROP¢ )
  EXIT
End
Else Do
  parse var source_server source_server_name  ¢\¢
  parse var servers.i target_server_name ¢\¢
  SAY ¢*************************************************************¢
  SAY ¢                                                             ¢
  SAY ¢* The distribution of data to the server was successful:     ¢
  SAY ¢                                                             ¢
  SAY ¢* Source Server Name    : ¢ source_server_name
  SAY ¢* Source Data           : ¢ data_to_get
  SAY ¢* Target Server Name    : ¢ target_server_name
  SAY ¢* Target Directory      : ¢ target.i
  SAY ¢                                                             ¢
  SAY ¢*************************************************************¢
End
```

Figure 59 (Part 4 of 5). DISTOS2.PROC, Copy from DSTSMPOS.Z

```
/*********************************************************************/
/* Drop the connection                                               */
/*********************************************************************/

RC=EWXVSE2( ¢EWXCONN DROP¢ )


End /* Do i = 1 to servers.0                                         */
Return(0)

/*********************************************************************/
/* Error handling                                                    */
/*********************************************************************/
ERROR:
SYNTAX:
SAY †---->>> BAD RETURNCODE †rc† received from command:†
SAY †---->>>       †sourceline(sigl)
SAY †---->>> at line †sigl
SAY †---->>>†
SAY †---->>> RECOVERY IN PROGRESS ...†

RC=EWXVSE2(¢EWXCONN DROP¢)

SAY ¢==========>>>>>>>>>>>>>>>> DROP RETURNS¢ RC

EXIT 99
/+
/*
/&
* $$ EOJ
```

Figure 59 (Part 5 of 5). DISTOS2.PROC, Copy from DSTSMPOS.Z

We cataloged the procedure as **DISTOS2.PROC** in the VSE/ESA sublibrary **PRD2.LANAPPL**.

We created a job to execute the cataloged procedure, as Figure 60 and submitted it to the RDR queue with DISP=L.

```
* $$ JOB JNM=DISTOS2,CLASS=7,DISP=L
// JOB DISTOS2
// LIBDEF *,SEARCH=(PRD2.LANAPPL,PRD2.LANRES)
/. Specify either Channel or APPC
// SET PARM COMM=APPC
// IF COMM=CHANNEL THEN
// SETPFIX LIMIT=16K
/*
// EXEC REXX=DISTOS2
/*
/&
* $$ EOJ
```

Figure 60. Job to Execute DISTOS2 REXX Procedure

Notice that we have to supply the type of connection, **APPC**. Now we are in the position to run REXX procedures to start the distribution function from VSE/ESA.

This is what you have to do to prepare for and start up LANRES/VSE Distribution and Administration:

1. Start the LANRES Distribution and Administration function on the OS/2 server.

   This is done via the **START EWXDIST** command or double clicking the **Distribution and Administration** icon.

2. Connect to the OS/2 server from the host.

   We released the **DISTOS2** job from the POWER reader queue.

The VSE/ESA job finishes when all commands are executed, or an error occurs. We used error condition handling (for example, SIGNAL ON ERROR) to be able to drop the connection to the OS/2 LAN server in case of an error.

If it finishes successfully, you receive the messages at the VSE/ESA console as in Figure 61.

```
F7 0007 // JOB DISTOS2
        DATE 12/18/96,CLOCK 18/37/26
F7 0007 EWXRES4054I APPC CONNECTION THROUGH PC_SERVER ESTABLISHED TO DIST
FUNCTION.
F7 0007 EWXRES4012I CONNECTION ESTABLISHED TO THE DIST FUNCTION ON THE SERVER.
F7 0007 EWXRES4018I YOU HAVE LOGGED-IN TO SERVER BOEITSS1 AS USER ADMIN.
F7 0007 EWXDST2315I 18:37:30 STARTING TRANSFER OF C:\LANRES\EWXCOMM.EXE
F7 0007 EWXDST2316I 18:37:33 COMPLETED TRANSFER OF C:\LANRES\EWXCOMM.EXE
F7 0007 EWXRES4046I DROPPING APPC CONNECTION THROUGH PC_SERVER TO DIST
FUNCTION.
F7 0007 EWXRES4054I APPC CONNECTION THROUGH PC_SERVER ESTABLISHED TO DIST
FUNCTION.
F7 0007 EWXRES4012I CONNECTION ESTABLISHED TO THE DIST FUNCTION ON THE SERVER.
F7 0007 EWXRES4018I YOU HAVE LOGGED-IN TO SERVER BOEITSS2 AS USER ADMIN2.
F7 0007 ************************************************************
F7 0007
F7 0007 * The distribution of data to the server was successful:
F7 0007
F7 0007 * Source Server Name    :  BOEITSS1
F7 0007 * Source Data           :  C:\LANRES\EWXCOMM.EXE
F7 0007 * Target Server Name    :  BOEITSS2
F7 0007 * Target Directory      :  D:\LANRES
F7 0007
F7 0007 ************************************************************
F7 0007 EWXRES4046I DROPPING APPC CONNECTION THROUGH PC_SERVER TO DIST
FUNCTION.
F7 0007 EOJ DISTOS2   MAX.RETURN CODE=0000
```

Figure 61. VSE Console Messages from DISTOS2 REXX Procedure

At the end of each LANRES distribution job, you should drop the connection to the OS/2 server, unless you intend to submit another LANRES Distribution and Administration job soon.

7.2 Administration Function

Now we are using the LANRES Distribution and Administration function to complete administrative tasks on our OS/2 LAN server from the VSE/ESA system.

We punched the member **EWXAUOS.Z** from the PRD2.LANRES to an ICCF library. Then we altered the procedure as shown in Figure 62 on page 76.

This procedure creates an OS/2 server user, doing the following steps:

1. Establish the connection from the host to the OS/2 LAN server
2. Log on to the LAN as user ADMIN, with administrator authorities
3. Create a new LAN user ID, called LANRES, with USER privileges
4. Create a home directory for this user on the D: drive and assign it as his U: drive
5. Create an alias with this home directory, to make it available to the network
6. Create an access profile for the resource
7. Create the user group PROGRAMMER
8. Add the LANRES user ID to this group
9. Display the characteristics of the user
10. Log off from the LAN server
11. Drop the connection
12. Write the LANRES-OUTPUT to the VSE/ESA console

As in the previous sample, we set variables according to our environment.

- We set the *Server* name, *Administrator* name and its *password*, in our case to **BOEITSS1, ADMIN** and **VMANDINO** respectively.
- We specified our connection type as **APPC** and **OS2LU2** as the LU name.

```
* $$ JOB JNM=EWXAUOS,CLASS=C,DISP=D
// JOB EWXAUOS    CATALOG EWXAUOS.PROC FOR START APPC DISTRIBUTION
// EXEC LIBR,PARM=¢MSHP¢
ACC S=PRD2.LANAPPL
CATALOG EWXAUOS.PROC    REPLACE=YES
/** REXX ************************************************************/
/*                                                                  */
/* COPYRIGHT -                                                      */
/*   5686-066 (C) COPYRIGHT IBM CORP. - 1995, 1996                  */
/*   LICENSED MATERIALS - PROPERTY OF IBM                           */
/*   SEE COPYRIGHT INSTRUCTIONS, G120-2083                          */
/*   ALL RIGHTS RESERVED.                                           */
/*                                                                  */
/* ROUTINE-NAME: EWXAUOS.Z                                          */
/*                                                                  */
/* STATUS: LANRES/VSE for VSE/ESA Version 2.2.0                     */
/*                                                                  */
/* FUNCTION: This is a sample REXX program that illustrates how    */
/*           OS/2 LAN server commands can be combined to add a      */
/*           user on the OS/2 LAN server.                           */
/*                                                                  */
/* NOTE:     This is a SAMPLE REXX program.                         */
/*                                                                  */
/* This REXX program:                                               */
/*   1. Establishes an APPC connection to an OS/2 LAN server.       */
/*   2. Performs logon with administrator authorization to the LAN */
/*      server.                                                     */
/*   3. Adds a user                                                 */
/*   4. Defines a home directory for the added user                 */
/*   5. Defines the home directory as resource                      */
/*   6. Adds a permission profile for the resource and gives the    */
/*      added user all rights for the homedirectory                 */
/*   7. Defines the group PROGRAMMER                                */
/*   8. Adds the user to the group programmer                       */
/*   9. Displays the characteristics of the added user              */
/*  10. Performs logoff from the LAN server.                        */
/*  11. Drops the connection to the OS/2 LAN server.                */
/*                                                                  */
/*  Change this sample REXX program to meet your needs. Especially */
/*  change the UserIds, Passwords and server names.                 */
/*                                                                  */
/*******************************************************************/
/*******************************************************************/
/* REXX output will be written to the console                       */
/*******************************************************************/
CALL ASSGN ¢STDOUT¢,¢SYSLOG¢

/*******************************************************************/
/* Error handling                                                   */
/*******************************************************************/
SIGNAL ON ERROR
SIGNAL ON SYNTAX
```

Figure 62 (Part 1 of 4). EWXAUOS.PROC, Copy from EWXAUOS.Z

```
Say ¢START TIME FOR ADDING USER¢ LANRES ¢IS¢ Time()¢.¢

/*****************************************************************/
/* Establish the connection to the OS/2 LAN server               */
/*****************************************************************/
RETC=EWXVSE2(¢EWXCONN LINK DIST BOEITSS1/ADMIN VMANDINO
     (APPC OS2LU2 PWIN UP PWOUT DOWN¢)
CALL VERYFY RETC ¢LINK¢

/*****************************************************************/
/* Perform logon to the OS/2 LAN server. Use a UserId with       */
/* administrator authority for this logon.                       */
/*****************************************************************/
RETC=EWXVSE2(¢EWXOS2 LOGON ADMIN /P:VMANDINO /D:BOEITSD¢)
CALL LROUTPUT
CALL VERYFY RETC ¢LOGON¢

/*****************************************************************/
/* Add the user LANRES to the OS/2 LAN server. The password of   */
/* this user is LANRESPW. The password has to be changed by the  */
/* user if he performs logon for the first time.                 */
/*****************************************************************/
RETC=EWXVSE2(¢EWXOS2 NET USER LANRES LANRESPW /ADD /ACTIVE:YES
/PRIVILEGE:USER /EXPIRES:NEVER
/FULLNAME:†Lanres User† /PASSWORDEXP:YES ¢)
CALL LROUTPUT
CALL VERYFY RETC ¢ADD USER¢

/*****************************************************************/
/* Create the home directory for the user LANRES.                */
/*****************************************************************/
RC=EWXVSE2(¢EWXOS2 MD D:\USERDISK\LANRES¢)
CALL lroutput

/*****************************************************************/
/* Change the user to have a home directory. The homedirectory   */
/* d:\userdisk\lanres on the server will be assigned to drive u:*/
/* for the user. The name of the server is LSERVER.              */
/*****************************************************************/
RC=EWXVSE2(¢EWXOS2 NET USER LANRES
/HOMEDIR:U:\BOEITSS1\D$\USERDISK\LANRES¢)
CALL lroutput

/*****************************************************************/
/* Define the home directory as resource                         */
/*****************************************************************/
RC=EWXVSE2(¢EWXOS2 NET ALIAS LANRDISK \\BOEITSS1 D:\USERDISK\LANRES¢)
CALL lroutput
```

Figure 62 (Part 2 of 4). EWXAUOS.PROC, Copy from EWXAUOS.Z

```
/*************************************************************/
/* Create an access profile for the resource.                */
/* The user will have all rights on his home directory       */
/*************************************************************/
RC=EWXVSE2(¢EWXOS2 NET ACCESS LANRDISK /ADD LANRES:RWCXDAP¢)
CALL lroutput

/*************************************************************/
/* Create the group programmer and add the user to this group*/
/*************************************************************/
RC=EWXVSE2(¢EWXOS2 NET GROUP PROGRAMMER /A¢)
CALL lroutput
RC=EWXVSE2(¢EWXOS2 NET GROUP PROGRAMMER LANRES /A¢)
CALL lroutput

/*************************************************************/
/* Display the characteristics of the user                   */
/*************************************************************/
RC=EWXVSE2(¢EWXOS2 NET USER LANRES¢)
CALL lroutput

/*************************************************************/
/* Perform logoff from the OS/2 LAN server                   */
/*************************************************************/
RC=EWXVSE2(¢EWXOS2 LOGOFF¢)
CALL lroutput

/*************************************************************/
/* Drop the connection to the OS/2 LAN server                */
/*************************************************************/
RC=EWXVSE2(¢EWXCONN DROP¢)
RETURN

/*************************************************************/
/*    WRITE LANRES-OUTPUT to console                         */
/*************************************************************/
LROUTPUT:

x=LANRES_RESULTS.0

if (x<>¢LANRES_RESULTS.0¢) then
  do i=1 to x
    say lanres_results.i
  end
else say ¢=====>>> BAD STEM¢

RETURN
```

Figure 62 (Part 3 of 4). EWXAUOS.PROC, Copy from EWXAUOS.Z

```
   /*****************************************************************/
   /*    VERYFY - Check Returncodes                                 */
   /*****************************************************************/
   VERYFY:

   parse arg retcode cmdname

   IF (retcode <> 0) THEN DO
      say cmdname || ¢ returns ¢ || retcode
      CALL STOP_ON_ERROR
   END
   RETURN

   /*****************************************************************/
   /*             STOP_ON_ERROR                                     */
   /*****************************************************************/
   STOP_ON_ERROR:

   retc=EWXVSE2(¢EWXCONN DROP¢)

   SAY ¢==========>>>>>>>>>>>>>>>> DROP RETURNS¢ retc

   EXIT 99
   RETURN

   /*****************************************************************/
   /* Error handling                                                */
   /*****************************************************************/
   ERROR:
   SYNTAX:
   SAY †---->>> BAD RETURNCODE †rc† received from command:†
   SAY †---->>>       †sourceline(sigl)
   SAY †---->>> at line †sigl
   SAY †---->>>†
   SAY †---->>> RECOVERY IN PROGRESS ...†

   RC=EWXVSE2(¢EWXCONN DROP¢)

   SAY ¢==========>>>>>>>>>>>>>>>> DROP RETURNS¢ RC

   EXIT 99
/+
/*
/&
* $$ EOJ
```

Figure 62 (Part 4 of 4). EWXAUOS.PROC, Copy from EWXAUOS.Z

We cataloged the procedure in the **PRD2.LANAPPL** as **EWXAUOS.PROC**.

Create the job as in Figure 63 on page 80.

```
* $$ JOB JNM=EWXAUOS,CLASS=8,DISP=L
// JOB EWXAUOS
// LIBDEF *,SEARCH=(PRD2.LANAPPL,PRD2.LANRES)
/. Specify either Channel or APPC
// SET PARM COMM=APPC
// IF COMM=CHANNEL THEN
// SETPFIX LIMIT=16K
/*
// EXEC REXX=EWXAUOS
/*
/&
* $$ EOJ
```

Figure 63. Job to Execute EWXAUOS REXX Procedure

Again you have to supply the type of connection, which is in our case **APPC** and the LANRES sublibraries.

Now you are able to execute another function of the Distribution and Administration.

1. Start EWXCOMM from the OS/2 server if it's not started
2. Submit the LRSAPPL job from VSE if it's not running
3. Start EWXDIST from the OS/2 server if it's not started
4. Release the job EWXAUOS from the reader queue

Now you have a new OS/2 server user ID created from VSE. If the function works correctly, you receive the VSE console messages as in Figure 64 on page 81.

```
F8 0008 // JOB EWXAUOS
        DATE 12/19/96,CLOCK 11/04/03
F8 0008 START TIME FOR ADDING USER LANRES IS 11:04:03.
F8 0008 EWXRES4054I APPC CONNECTION THROUGH PC_SERVER ESTABLISHED TO DIST
FUNCTION.
F8 0008 EWXRES4012I CONNECTION ESTABLISHED TO THE DIST FUNCTION ON THE SERVER.
F8 0008 EWXRES4018I YOU HAVE LOGGED-IN TO SERVER BOEITSS1 AS USER ADMIN.
F8 0008 The user ID was not added as a message name.
F8 0008 The command completed successfully.
F8 0008 The command completed successfully.
F8 0008 The command completed successfully.
F8 0008 The command completed successfully.
F8 0008 NET2223: The group already exists.
F8 0008 The command completed successfully.
F8 0008 User ID                              LANRES
F8 0008 Full Name                            Lanres User
F8 0008 Comment
F8 0008 User¢s comment
F8 0008 Parameters
F8 0008 Country code                         000 ( System Default)
F8 0008 Privilege level                      USER
F8 0008 Operator privileges                  None
F8 0008 Account active                       Yes
F8 0008 Account expires                      Never
F8 0008 Password last set                    01-01-80 12:00am
F8 0008 Password expires                     Expired
F8 0008 Password changeable                  01-01-80 12:00am
F8 0008 Password required                    Yes
F8 0008 User may change password             Yes
F8 0008 Requesters allowed                   All
F8 0008 Maximum disk space                   Unlimited
F8 0008 Preferred logon server               Any
F8 0008 Logon script
F8 0008 Home directory                       U:\BOEITSS1\D$\USERDISK\LANRES
F8 0008 Last logon                           Never
F8 0008 Logon hours allowed                  All
F8 0008 Group memberships                    *USERS
F8 0008                                      *PROGRAMMER
F8 0008 Logon assignments for LANRES:
F8 0008    None
F8 0008 Applications assigned to LANRES:
F8 0008    None
F8 0008 The command completed successfully.
F8 0008 The command completed successfully.
F8 0008 EWXRES4046I DROPPING APPC CONNECTION THROUGH PC_SERVER TO DIST
FUNCTION.
F8 0008 EOJ EWXAUOS      MAX.RETURN CODE=0000
```

Figure 64. VSE Console Messages from EWXAUOS REXX Procedure

Finally, to conclude our test we deleted the created user ID.

Therefore, we changed the sample REXX procedure **EWXDUOS.Z** from the PRD2.LANRES library.

This procedure deletes the user ID LANRES by the following steps:

1. Start the connection from the host to the LAN
2. Log on the user ADMIN, with administrator authorities
3. Delete the user ID from the group
4. Delete the user ID from the OS/2 server
5. Delete all files from the home directory, if there are any
6. Remove the home directory
7. Delete the created access profile for this home directory
8. Delete the resource for this home directory
9. Perform logoff from the LAN server
10. Drop the connection to the OS/2 LAN server
11. Write the LANRES-OUTPUT to the VSE/ESA console

As in the previous sample, you have to set variables according to your environment.

- We set the *server* name, *administrator* user ID and it's *password*, to **BOEITSS1, ADMIN** and **VMANDINO** respectively.
- We specified our connection type as **APPC** and **OS2LU2** as the LU name.

The changed procedure is shown in Figure 65 on page 83.

```
* $$ JOB JNM=EWXDUOS,CLASS=C,DISP=D
// JOB EWXDUOS    CATALOG EWXDUOS.PROC FOR START APPC DISTRIBUTION
// EXEC LIBR,PARM=¢MSHP¢
ACC S=PRD2.LANAPPL
CATALOG EWXDUOS.PROC    REPLACE=YES
/** REXX ************************************************************/
/*                                                                  */
/* COPYRIGHT -                                                      */
/*   5686-066 (C) COPYRIGHT IBM CORP. - 1996, 1996                  */
/*   LICENSED MATERIALS - PROPERTY OF IBM                           */
/*   SEE COPYRIGHT INSTRUCTIONS, G120-2083                          */
/*   ALL RIGHTS RESERVED.                                           */
/*                                                                  */
/* ROUTINE-NAME: EWXDUOS.Z                                          */
/*                                                                  */
/* STATUS: LANRES/VSE for VSE/ESA Version 2.2.0                     */
/*                                                                  */
/* FUNCTION: This is a sample REXX program that illustrates how    */
/*           OS/2 LAN server commands can be combined to delete a  */
/*           user on the OS/2 LAN server.                           */
/*                                                                  */
/* NOTE:     This is a SAMPLE REXX program.                         */
/*                                                                  */
/* This REXX program:                                               */
/*   1. Establishes an APPC connection to an OS/2 LAN server.       */
/*   2. Performs logon with administrator authorization to the LAN */
/*      server.                                                     */
/*   3. Deletes the user from the group PROGRAMMER                  */
/*   4. Deletes the user from the OS/2 LAN server                   */
/*   5. Deletes all files from the home directory of the user       */
/*   6. Removes the home directory of the user                      */
/*   7. Deletes the access profile for the home directory           */
/*   8. Deletes the resource for the home directory                 */
/*  10. Performs logoff from the LAN server.                        */
/*  11. Drops the connection to the OS/2 LAN server.                */
/*                                                                  */
/*  Change this sample REXX program to meet your needs. Especially */
/*  change the UserIds and Passwords.                               */
/*                                                                  */
/********************************************************************/
/********************************************************************/
/* REXX output will be written to the console                       */
/********************************************************************/
CALL ASSGN ¢STDOUT¢,¢SYSLOG¢

/********************************************************************/
/* Error handling                                                   */
/********************************************************************/
SIGNAL ON ERROR
SIGNAL ON SYNTAX
```

Figure 65 (Part 1 of 4). EWXDUOS.PROC, Copy from EWXDUOS.Z

```
Say ¢START TIME FOR DELETING USER¢ LANRES ¢IS¢ Time()¢.¢

/*****************************************************************/
/* Establish the connection to the OS/2 LAN server               */
/*****************************************************************/
RETC=EWXVSE2(¢EWXCONN LINK DIST BOEITSS1/ADMIN VMANDINO
     (APPC OS2LU2 PWIN UP PWOUT DOWN¢)
CALL VERYFY RETC ¢LINK¢

/*****************************************************************/
/* Perform logon to the OS/2 LAN server. Use a UserId with       */
/* administrator authority for this logon.                       */
/*****************************************************************/
RETC=EWXVSE2(¢EWXOS2 LOGON ADMIN /P:VMANDINO /D:BOEITSD¢)
CALL lroutput
CALL VERYFY RETC ¢LOGON¢

/*****************************************************************/
/* Delete the user LANRES from the group programme               */
/*****************************************************************/
RC=EWXVSE2(¢EWXOS2 NET GROUP PROGRAMMER LANRES /D¢)
CALL lroutput


/*****************************************************************/
/* Delete the user LANRES from the OS/2 LAN server.              */
/*****************************************************************/
RC=EWXVSE2(¢EWXOS2 NET USER LANRES /DELETE ¢)
CALL lroutput

/*****************************************************************/
/* Delete all files from the home directory and remove the home */
/* directory.                                                    */
/*****************************************************************/
RC=EWXVSE2(¢EWXOS2 DEL d:\USERDISK\LANRES\*.* /n ¢)
RC=EWXVSE2(¢EWXOS2 RD D:\USERDISK\LANRES¢)
CALL lroutput

/*****************************************************************/
/* Delete the access profile for the resource LANRDISK           */
/*****************************************************************/
RC=EWXVSE2(¢EWXOS2 NET ACCESS LANRDISK /DELETE¢)
CALL lroutput

/*****************************************************************/
/* Delete the resource for the home directory                    */
/*****************************************************************/
RC=EWXVSE2(¢EWXOS2 NET ALIAS LANRDISK /DE¢)
CALL lroutput
```

Figure 65 (Part 2 of 4). EWXDUOS.PROC, Copy from EWXDUOS.Z

```
/*****************************************************************/
/* Perform logoff from the OS/2 LAN server                       */
/*****************************************************************/
RC=EWXVSE2(¢EWXOS2 LOGOFF¢)
CALL lroutput

/*****************************************************************/
/* Drop the connection to the OS/2 LAN server                    */
/*****************************************************************/
RC=EWXVSE2(¢EWXCONN DROP¢)
RETURN

/*****************************************************************/
/*    WRITE LANRES-OUTPUT to console                             */
/*****************************************************************/
LROUTPUT:

x=LANRES_RESULTS.0

if (x<>¢LANRES_RESULTS.0¢) then
  do i=1 to x
    say lanres_results.i
  end
else say ¢=====>>> BAD STEM¢

RETURN

/*****************************************************************/
/*    VERYFY - Check Returncodes                                 */
/*****************************************************************/
VERYFY:

parse arg retcode cmdname

IF (retcode <> 0) THEN DO
   say cmdname || ¢ returns ¢ || retcode
   CALL STOP_ON_ERROR
END
RETURN

/*****************************************************************/
/*             STOP_ON_ERROR                                     */
/*****************************************************************/
STOP_ON_ERROR:

retc=EWXVSE2(¢EWXCONN DROP¢)

SAY ¢==========>>>>>>>>>>>>>>>> DROP RETURNS¢ retc

EXIT 99
RETURN
```

Figure 65 (Part 3 of 4). EWXDUOS.PROC, Copy from EWXDUOS.Z

```
   /*************************************************************/
   /* Error handling                                            */
   /*************************************************************/
   ERROR:
   SYNTAX:
   SAY †---->>> BAD RETURNCODE †rc† received from command:†
   SAY †---->>>       †sourceline(sigl)
   SAY †---->>> at line †sigl
   SAY †---->>>†
   SAY †---->>> RECOVERY IN PROGRESS ...†

   RC=EWXVSE2(¢EWXCONN DROP¢)

   SAY ¢==========>>>>>>>>>>>>>>>> DROP RETURNS¢ RC

   EXIT 99
/+
/*
/&
* $$ EOJ
```

Figure 65 (Part 4 of 4). EWXDUOS.PROC, Copy from EWXDUOS.Z

Submit the job to catalog in the **PRD2.LANAPPL** sublibrary as **EWXDUOS.PROC**.

Create a second job as in Figure 66 and submit it to the POWER reader queue with DISP=L.

```
* $$ JOB JNM=EWXDUOS,CLASS=8,DISP=L
// JOB EWXDUOS
// LIBDEF *,SEARCH=(PRD2.LANAPPL,PRD2.LANRES)
/. Specify either Channel or APPC
// SET PARM COMM=APPC
// IF COMM=CHANNEL THEN
// SETPFIX LIMIT=16K
/*
// EXEC REXX=EWXDUOS
/*
/&
* $$ EOJ
```

Figure 66. Job to Execute EWXDUOS REXX Procedure

Again you have to supply the type of connection, **APPC** and the LANRES sublibraries.

Now we are able to execute another function of the Distribution and Administration:

1. Start EWXCOMM from the OS/2 server if it is not started
2. Submit the LRSAPPL job from VSE if it is not running
3. Start EWXDIST from the OS/2 server if it is not started
4. Release the job EWXDUOS from the reader queue

This deleted the LAN user ID LANRES that had been created in the previous step. We received the following VSE console messages:

```
F8 0008 // JOB EWXDUOS
        DATE 12/19/96,CLOCK 11/18/37
F8 0008 START TIME FOR DELETING USER LANRES IS 11:18:37.
F8 0008 EWXRES4054I APPC CONNECTION THROUGH PC_SERVER ESTABLISHED TO DIST
FUNCTION.
F8 0008 EWXRES4012I CONNECTION ESTABLISHED TO THE DIST FUNCTION ON THE SERVER.
F8 0008 EWXRES4018I YOU HAVE LOGGED-IN TO SERVER BOEITSS1 AS USER ADMIN.
F8 0008 The command completed successfully.
F8 0008 The command completed successfully.
F8 0008 The command completed successfully.
F8 0008 The command completed successfully.
F8 0008 The command completed successfully.
F8 0008 The command completed successfully.
F8 0008 EWXRES4046I DROPPING APPC CONNECTION THROUGH PC_SERVER TO DIST
FUNCTION.
F8 0008 EOJ EWXDUOS      MAX.RETURN CODE=0000
```

Figure 67. VSE Console Messages from EWXDUOS REXX Procedure

Chapter 8. How to Use LANRES/VSE Printing Services

LANRES/VSE print serving provides the possibility to print VSE/ESA list queue entries on an OS/2 printer and lets an OS/2 client print files on a VSE/ESA host printer. In the following sections we describe how to set up both printing environments.

8.1 Host-to-LAN Printing

We did the following to prepare for and start up LANRES/VSE Host-to-LAN Printing:

1. Create a printer object on the OS/2 server
2. On the VSE host:
   a. Create the EWXHLPRT.PROCS procedures file for Host-to-LAN Printing
   b. Create REXX procedure EWXHLSRV.PROC which contains VSE print server commands
   c. Create a job that starts the VSE Host-to-LAN Printing server
3. Start the LANRES Host-to-LAN Printing application on the OS/2 server
4. Run the job to start the Host-to-LAN print server on VSE.

Let us know have a look at these steps in more detail.

8.1.1 Creating a Printer on the OS/2 Server

First of all, you have to have a PC printer that is attached to an OS/2 server in your LAN.

We had an IBM 4019 printer locally attached to our OS/2 server.

These are the steps we did in order to define that printer to the OS/2 server:

1. Open the **OS/2 System** on the *Desktop*.
2. Open the **Templates** folder in the *OS/2 System - Icon View* window. Drag the **Printer** template icon and drop it on the *Desktop*.
3. Create the printer specifying the name, default printer driver and the output port in the *Create a Printer* window (see Figure 68 on page 90). We used **LRS4019** as the *Name*, selected **IBM 4019 LaserPrinter E** as *Default printer driver* and assigned this printer to *Output port* **LPT1**.

This printer can now be used by the Host-to-LAN Printing function.

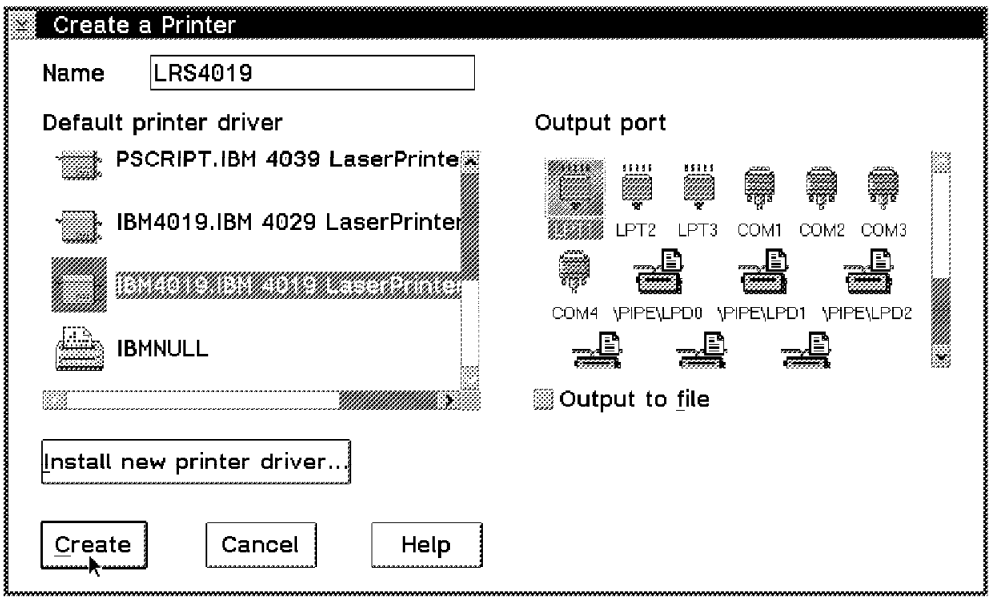

Figure 68. Create a Printer Window

8.1.2 Create Host-to-LAN Print Procedures File EWXHLPRT.PROCS

The LANRES/VSE Host-to-LAN Printing function needs information such as the OS/2 printer name, OS/2 server name and other parameters. This information has to be provided in a member called EWXHLPRT.PROCS. You can use the sample file 'EWXHLPRT.Z' in the LANRES/VSE installation sublibrary to create your print procedures file *'EWXHLPRT.PROCS'*.

LANRES/VSE offers three print exits for formatting the list queue entry.

We used the print exit EWXHLINE.PROC.

The print exit **EWXHLINE.PROC** is used to handle ANSI (ASA) print control characters, whereas the print exit **EWXHMCC.PROC** is used to handle MCC print control characters.

You can see the format of a VSE/POWER list queue entry by using the command **'PDISPLAY LST,jobname,FULL=YES'**. If no record format is displayed, the record format 'MCC' is assumed (which is the default on VSE), otherwise the record format is indicated by the keyword *'RF='*.

The following lists the control characters which are handled by the LANRES/VSE print exits. A control character which is not explicitly handled defaults to 'space one line'.

EWXHLINE.PROC

Control Character	Meaning
blank	Space 1 line
0	Space 2 lines
-	Space 3 lines
+	Suppress space
1	Skip to line 1 on new page

EWXHMCC.PROC

Control Character	Meaning
x'09'	Space one line
x'11'	Space two lines
x'19'	Space three lines
x'01'	Suppress space
x'89'	Skip to line 1 on new page
x'8**B**'	Skip to line 1 on new page

If your input print file contains print control characters, which are not correctly handled by the exit, edit the system supplied exits and change them accordingly.

You can use the VSE/POWER diagnostic and service aid *IPW$$DD* to dump the POWER list queue files to find out which printer channel commands are in the first column of the records of the list queue entries.

The job to invoke IPW$$DD shown in Figure 69 prints the queue entries in hexadecimal format. The resulting printlog from the VSE/ESA console is shown in Figure 70 on page 92.

```
* $$ JOB JNM=IPW$$DD,CLASS=0,DISP=D
// JOB IPW$$DD   PRINT POWER LIST QUEUE
// EXEC PROC=DTRPOWR
// EXEC IPW$$DD
/*
/&
* $$ EOJ
```

Figure 69. VSE/POWER Job to Print POWER LST Queue Entries

Notes:

// EXEC PROC=DTRPOWR
This procedure assigns the POWER files to the partition in which the job is running.

// EXEC IPW$$DD
Name of the VSE/POWER utility for printing queue entries. For more information about this utility refer to Appendix B of *VSE/POWER Administration and Operation, SC33-6633*.

```
10 BG 0000 // JOB IPW$$DD   PRINT FROM POWER LIST QUEUE
           DATE 12/08/96,CLOCK 11/09/59
11 BG-0000 DUMP FUNCTION=
12 0 AUTOEXEC,,L
13 BG-0000 DUMP FUNCTION=
14 0 EOJ
15 BG 0000 EOJ IPW$$DD
           DATE 12/08/96,CLOCK 11/10/17,DURATION   00/00/17
END OF UTILITY
```

Figure 70. VSE/ESA Console Printlog for Printing VSE/POWER LIST Queue

Notes:

11 BG-0000 DUMP FUNCTION=
IPW$$DD asks first for specification of the VSE/POWER list queue entry to be printed.

0 AUTOEXEC,,L
Reply to preceding question by IPW$$DD. AUTOEXEC is the name of the VSE/POWER list queue entry we want to print. 'L' tells the program that we want to print from the list queue.

13 BG-0000 DUMP FUNCTION=
Second question asked by IPW$$DD after the list queue entry was printed.

0 EOJ Specify 'EOJ' if you want to end the utility.

To find out which control characters have been used in the print output we first used the VSE/POWER command

d lst,jobname,full=yes

as shown in Figure 71.

```
D LST,AUTOEXEC,FULL=YES
AR 0015 1C39I COMMAND PASSED TO VSE/POWER
F1 0001 1R46I    LIST QUEUE   P D C S  PAGES  CC FORM
F1 0001 1R46I  AUTOEXEC 64568 3 L Y        1   1      TO=(USER1)
                                                      FROM=(SYSA)
F1 0001        D=12/16/96 DBGP=000001 L=00000011 RF=ASA
```

Figure 71. Displaying VSE/ESA Print Control Characters

Notes:

- **RF=ASA** indicates that this print file uses ASA print control characters.

- If there is no RF option, then System/370 control characters (see *ESA/370 Reference Summary, GX20-0406*) are used.

The batch job shown in Figure 72 on page 94 provides a hexadecimal representation of the entry ′AUTOEXEC′ as described above with ASA print control characters.

```
// JOB IPW$$DD   DRUCKEN AUS POWER-LIST-Q  DATE 12/08/96,CLOCK 11/34/15
// EXEC PROC=DTRPOWR
// ASSGN SYS000,DISK,VOL=SYSWK1,SHR      POWER ACCOUNT FILE
1T20I  SYS000 HAS BEEN ASSIGNED TO X¢F01¢ (TEMP)
// ASSGN SYS001,DISK,VOL=DOSRES,SHR      POWER QUEUE FILE
1T20I  SYS001 HAS BEEN ASSIGNED TO X¢F00¢ (TEMP)
// ASSGN SYS002,DISK,VOL=SYSWK1,SHR      POWER DATA FILE 1
1T20I  SYS002 HAS BEEN ASSIGNED TO X¢F01¢ (TEMP)
EOP DTRPOWR
// EXEC IPW$$DD
DUMP FUNCTION=AUTOEXEC,,L
Q-BLOCK     40  CH  10/16/96                          AUTOEXEC  L  PSP
Q-RECORD   652  ZN  FF6FF6FF099209924444444444444444CEEDCECCF3D1FDED00
                NM  10116195030C030C0000000000000000014365753C830F72700
                   01...5...10...15...20...25...30...35...40...45...50
                    Y3                                LM
                    EF0000000044440000000000000000D0000000000000000
                    83000B0001000000000000000B000000300000000000000000
                    ...55...60...65...70...75...80...85...90...95.....
                CH                      {           †8
                ZN  4444000000000000000C4444444400447F0040000000000000
                NM  00000000000000000000000000000000F840000000000000000
                  101...5...10...15...20...25...30...35...40...45...50
                               +           &   &           USER1
                    000000A218D940000000000015001500004444444DCDDF444
                    000000B9E9AAE00000000000E000E000010000000031591000
                    ...55...60...65...70...75...80...85...90...95.....
                CH          SYSA
                ZN  44444444EEEC444400004444444400000000000000000000000
                NM  00000000282100000000000000000000000010000000000000
                  201...5...10...15...20...25...30...35...40...45...50

                    000000
                    000000
                    ...55.
-
-
-
C  567 BL  4080 CH      SEH:     0
                CH
                ZN  000000004444444444440000000000000000000000000000A1
                NM  00000000000000000000000000000000000030000000000B3
                  701...5...10...15...20...25...30...35...40...45...50
                     J  4         D:\WINDOWS\SMARTDRV.EXE        @CALL
                    8D65F00 104 0000C7EECDCDEEEEDCDECDE4CEC020400007CCDD
                    7196400 F10 20004A0695466202419349 5B57502102000C3133
                    ...55...60...65...70...75...80...85...90...95.....
                CH   C:\NWCLIENT\STARTNET        @ECHO OFF        SET
                ZN  4C7EDECDCCDEEEECDEDCE010400007CCCD4DCC02040000ECE4
                NM  03A0563395530231935530110200 0C53860666091020002530
                  801...5...10...15...20...25...30...35...40...45...50
                    PATH=D:\WINDOWS;C:\DOS;%PATH%        SET TEMP=C:\D
                    DCEC7C7EECDCDEE5C7ECDE56DCEC6010400 00ECE4ECDD7C7EC
                    7138E4A06954662E3A0462EC7138C071020002530 3547E3A04
                    ...55...60...65...70...75...80...85...90...95.....
```

Figure 72 (Part 1 of 2). VSE/POWER Printout with ASA Print Control Characters

```
                CH  OS        C:\DOS\MODE.COM CON CP PREP=((850) C:\DO
                ZN  DE03040000C7ECDEEDDCC4CDD4CDD4CD4DDCD744FFF54C7ECD
                NM  620A1020003A046204645B364036503707957EDD850D03A046
                  901...5...10...15...20...25...30...35...40...45...50
                    S\EGA.CPI)        C:\DOS\MODE.COM CON CP SEL=850
                    EECCC4CDC502040000C7ECDEEDDCC4CDD4CDD4CD4ECD7FFF02
                    20571B379D061020003A046204645B36403650370253E8500F
                    ...55...60...65...70...75...80...85...90...95.....
                CH        C:\DOS\KEYB.COM US,,C:\DOS\KEYBOARD.SYS
                ZN  040000C7ECDEEDCEC4CDD4EE66C7ECDEEDCECDCDC4EEE01040
                NM  1020003A046202582B364042BB3A0462025826194B28209102
                 1001...5...10...15...20...25...30...35...40...45...50
                      C:\DOS\DOSKEY.COM       SET IBMAV=C:\DOS
                    000C7ECDEECDEDCE4CDD01040000ECE4CCDCE7C7ECDE020400
                    0003A046204620462258B364081020002530924l5E3A0462071020
                    ...55...60...65...70...75...80...85...90...95.....
                CH    CALL C:\DOS\IBMAVDR.BAT C:\DOS\
                ZN  00CCDD4C7ECDEECCDCECD4CCE4C7ECDEE030F40000300020000
                NM  00313303A0462092415498B21303A04620084F000000000C000
                 1101...5...10...15...20...25...30...35...40...45...50
                    A     J  4    J |                    9
                    C00A18D65F0A18D747000000000000000000000F000000000000
                    100B3719640B3719F0000000000000000000005090000000000000
                    ...55...60...65...70...75...80...85...90...95.....
-
-
-
EOJ IPW$$DD          DATE 12/08/96,CLOCK 11/34/29,DURATION 00/00/13
```

Figure 72 (Part 2 of 2). VSE/POWER Printout with ASA Print Control Characters

Notes:

- This is the hexadecimal representation of a printout with ASA print control characters produced by IPW$$DD.
- The highlighted values must be read vertically, that is the marked values read as X'1F0140'. X'1F' in this position is the length of the record and X'40' is the printer control character, that means space 1 line before printing the record.
  Refer to *VSE/POWER Diagnosis Reference, LY33-9163* for more information on how to interpret IPW$$DD dump outputs.

In order to be able to use our OS/2 printer, we changed the LANRES/VSE provided sample procedures file EWXHLPOS.Z according to our needs and saved it as EWXHLPRT.PROCS (see Figure 73 on page 96).

```
* $$ JOB JNM=EWXHLPRT,CLASS=C,DISP=D
// JOB EWXHLPRT          CATALOG EWXHLPRT PROCEDURE
// LIBR
ACCESS SUBLIB=PRD2.LANAPPL
CATALOG EWXHLPRT.PROCS                      REPLACE=YES

/*--------------------------------------------------------------------*/
/*  COPYRIGHT -                                                       */
/*    5686-066 (C) COPYRIGHT IBM CORP. - 1994, 1996                   */
/*    LICENSED MATERIALS - PROPERTY OF IBM                            */
/*    SEE COPYRIGHT INSTRUCTIONS, G120-2083                           */
/*                                                                    */
/* TABLE-NAME: EWXHLPRT.PROCS for OS/2                                */
/*                                                                    */
/* DESCRIPTIVE-NAME: host to lan print procedures table.              */
/*                                                                    */
/* FUNCTION:                                                          */
/* This file contains a table of queues that are used for the         */
/* host-to-LAN print system.  Each line is a group of blank           */
/* delimited tokens that determine how print output is processed.     */
/* The first token can be either                                      */
/*    - LPTn or COMn if the printer is directly attached or           */
/*    - a LAN resource name for the printer. In this case the         */
/*      corresponding server name has to be specified as well.        */
/* The second token is the user exit name.                            */
/* The third token is the user exit type.                             */
/* The fourth token is the VSE/POWER To user ID associated with the   */
/* print queue.                                                       */
/* These tokens can be followed by parameters for the user exit.      */
/*                                                                    */
/* This is a USER modifiable data set.  The processing routines       */
/* that go with each queue are also user modifiable.  In this way,    */
/* it is easy to add new queues that use the same type of             */
/* processing to the system.                                          */
/*                                                                    */
/* After the print control definitions is a parm list that is         */
/* passed into the user written routine.  You must supply the †(†     */
/* to separate the routine name from the parameter list.  The         */
/* parameter list is flexible; specify any data here that needs to    */
/* be sent to the called print routine.                               */
/*                                                                    */
/* Table format:                                                      */
/* PRINTER PROCNAME PROCTYPE TOUSER print control definitions (parms*/
/*                                                                    */
/* Where PROCNAME is the name of an IBM supplied user exit or a       */
/* customer generated user exit.                                      */
/*                                                                    */
/* Where PROCTYPE is PROC, or INTERNAL.                               */
/*                                                                    */
/* Where the following describes the print control definitions:       */
/* - SERVER servername (opt)                                          */
/* - ASCII or BINARY ( opt, default: ASCII )                          */
/* - ON or OFF ( opt, default: ON )                                   */
/* - NOCC or CC ( opt, default: NOCC )                                */
/*                                                                    */
```

Figure 73 (Part 1 of 2). EWXHLPRT.PROCS

```
/*                                                                  */
/* Where parms can be (depending upon the routine being called):    */
/* EWXHLINE  ->  No parameters are needed                           */
/* EWXHMCC   ->  No parameters are needed                           */
/* EWXHLTRN  ->  The name of the profile is needed. If the profile  */
/*               is EWXPS.Z, the banner page should not be printed  */
/*               because a PostScript error occurs if the banner    */
/*               is printed.                                        */
/*                                                                  */
/* Note that the VSE/POWER To user ID must be unique within this    */
/* /* table. A maximum of eight different VSE/POWER To user IDs may */
/* /* be specified.                                                 */
/*------------------------------------------------------------------*/

/* PRINTER   PROCNAME PROC TOUSER print control definitions ( parms */
/*------------------------------------------------------------------*/
LPT1         EWXHLINE PROC USER1    ASCII ON  CC
/* LPT2      EWXHLINE PROC BILLPRT ASCII ON CC
/* LPT3      EWXHMCC  PROC HLQ ASCII OFF CC
/* PS79060   EWXHLTRN INTERNAL POSTSCR SERVER BOESSP01 ASCII OFF CC
             (EWXPS.Z */
/+
/*
/&
* $$ EOJ
```

Figure 73 (Part 2 of 2). EWXHLPRT.PROCS

This sample file defines a printer in the LAN to be used in order to print VSE reports. We specified **LPT1** as *Printer* because our printer is locally attached to the OS/2 server and assigned to the parallel port LPT1.

PROCNAME **EWXHLINE** and **ASCII ON CC** is specified to translate VSE print data from EBCDIC to ASCII and transform ANSI (ASA) carriage control characters to ASCII control characters. We chose the CC option, that means that the input file contains print control characters in the first column. This is the default on VSE and therefore CC should always be used.

We set *TOUSER* to **USER1**. POWER list queue entries with this user ID as the destination (LDEST= or DEST= parameter) will be printed by LANRES on the OS/2 printer LPT1 using EWXHLINE for translation.

We cataloged the procedure in the VSE/ESA sublibrary PRD2.LANAPPL as **EWXHLPRT.PROCS**.

8.1.3 Create REXX Procedure for Host-to-LAN Print Server Startup

We used the sample member EWXHLSRV.Z from the LANRES installation sublibrary PRD2.LANRES and modified it according to our environment (see Figure 74 on page 98).

```
* $$ JOB JNM=HLSRV,CLASS=C,DISP=D
// JOB HLSRV   CATALOG THE REXX/VSE PROCEDURE EWXHLSRV.PROC
/. X ************************************************************
/. X
/. X COPYRIGHT -
/. X  5686-066 (C) COPYRIGHT IBM CORP. - 1996, 1996
/. X  LICENSED MATERIALS - PROPERTY OF IBM
/. X  SEE COPYRIGHT INSTRUCTIONS, G120-2083
/. X  ALL RIGHTS RESERVED.
/. X
/. X STATUS:  LANRES/VSE 6.1.1
/. X
/. X MEMBER-NAME: EWXHLSRV.Z
/. X
/. X DESCRIPTIVE-NAME: SAMPLE JOB TO CATALOG AND RUN A REXX
/. X                   PROCEDURE WHICH CAN BE USED TO START A
/. X                   LANRES/VSE HOST-TO-LAN PRINT SERVER.
/. X
/. X MODIFY THIS SAMPLE ACCORDING TO YOUR NEEDS
/. X ************************************************************
// EXEC LIBR
   ACCESS SUBLIB=PRD2.LANAPPL
   CATALOG EWXHLSRV.PROC  REPLACE=YES
 /*************************************************************/
 /* SPECIFY THE FOLLOWING VALUES ACCORDING TO YOUR NEEDS      */
 /*************************************************************/
 CLASSES = ¢A E¢               /* SPECIFY THE VSE/POWER LIST     */
                                /* QUEUE CLASSES WHICH ARE TO BE  */
                                /* HANDLED                        */

COMM_PROTOCOL = ¢APPC¢         /* SPECIFY EITHER APPC OR CHANNEL */
IF COMM_PROTOCOL = ¢APPC¢ THEN
   TARGET = ¢OS2LU2¢           /* LU NAME OF THE SERVER          */
ELSE
   TARGET = ¢944¢              /* CHANNEL ADDRESS                */

PWIN = ¢UP¢                    /* SPECIFY A COMPONENT PASSWORD   */
PWOUT = ¢DOWN¢                 /* SPECIFY A COMPONENT PASSWORD   */
/*************************************************************/
/* START THE HOST-TO-LAN PRINT SERVER                        */
/*************************************************************/
    RC=EWXVSE2(¢EWXHLSRV ¢ CLASSES ¢( ¢ COMM_PROTOCOL TARGET,
    ¢ PWIN ¢ PWIN ¢ PWOUT ¢ PWOUT )
 EXIT(RC)
/+
/*
/&
* $$ EOJ
```

Figure 74. EWXHLSRV.PROC, Copy from EWXHLSRV.Z

We set the following parameters for the LAN-to-Host Printing function:

- The POWER list queue classes that we want to assign to the OS/2 server attached printers are **A** and **E**
- We use **APPC** as communication protocol
- The LU name of the OS/2 server is **OS2LU2**

We cataloged this procedure as **EWXHLSRV.PROC** in the VSE/ESA sublibrary PRD2.LANAPPL.

8.1.4 Create LANRES/VSE Host-to-LAN Printing Startup Job

We used the following job (Figure 75) to execute the procedure that starts the Host-to-LAN Printing server.

```
* $$ JOB JNM=EWXHLSRV,CLASS=7,DISP=L
// JOB EWXHLSRV      CALL THE REXX PROCEDURE
// LIBDEF *,SEARCH=(PRD2.LANAPPL,PRD2.LANRES)
/. X SPECIFY EITHER CHANNEL OR APPC
// SETPARM COMM=APPC
// IF COMM=CHANNEL THEN
// SETPFIX LIMIT=16K
// EXEC REXX=EWXHLSRV
/*
/&
* $$ EOJ
```

Figure 75. Job to Execute EWXHLSRV REXX Procedure

In the job starting the EWXHLSRV procedure, we set the communication protocol to **APPC** and added our LANRES sublibraries to the LIBDEF search chain.

8.1.5 Start Up Host-to-LAN Printing on the OS/2 Server

Make sure that the LANRES communication (EWXCOMM) is started on the OS/2 server (see Figure 22 on page 36).

Start the LANRES Host-to-LAN Print application on the OS/2 server using the OS/2 command line interface (start **EWXHLPRT**) or double-click the **LAN Printing** icon. See Figure 22 on page 36

8.1.6 Start Up Host-to-LAN Print Server on VSE/ESA

- If you are using an APPC connection, you first have to start the APPC server on VSE/ESA in a separate partition. Therefore, we started the job LRSAPPC (see Figure 20 on page 31).
- Start the LANRES Host-to-LAN Print application on VSE/ESA. We released our **EWXHLSRV** job in the POWER reader queue. As a result, the following messages were displayed on the VSE/ESA console (Figure 76).

```
F7 0007 // JOB EWXHLSRV      CALL THE REXX PROCEDURE
        DATE 12/14/96,CLOCK 10/30/57
F7 0007 EWXPHL4054I APPC CONNECTION THROUGH PC_SERVER ESTABLISHED TO HLPRT
FUNCTION.
F7 0007 EWXPHL4012I CONNECTION ESTABLISHED TO THE HLPRT FUNCTION ON THE
SERVER.
```

Figure 76. Job to Execute EWXHLSRV REXX Procedure

On the OS/2 server we used the **Status Information** icon to confirm that the LAN-to-Host Printing function has successfully connected to the OS/2 server (see Figure 77 on page 100).

The LAN-to-Host Printing server procedure EWXHLSRV remains running in the VSE/ESA partition until it is terminated explicitly by the VSE/ESA console command **MSG xx,DATA=STOP** (**xx** is the partition ID in which the EWXHLSRV is running).

On the OS/2 server we used the **Status Information** icon in the LANRES folder to check the current status/connection of the Host-to-LAN print function HLPRINT (see Figure 77).

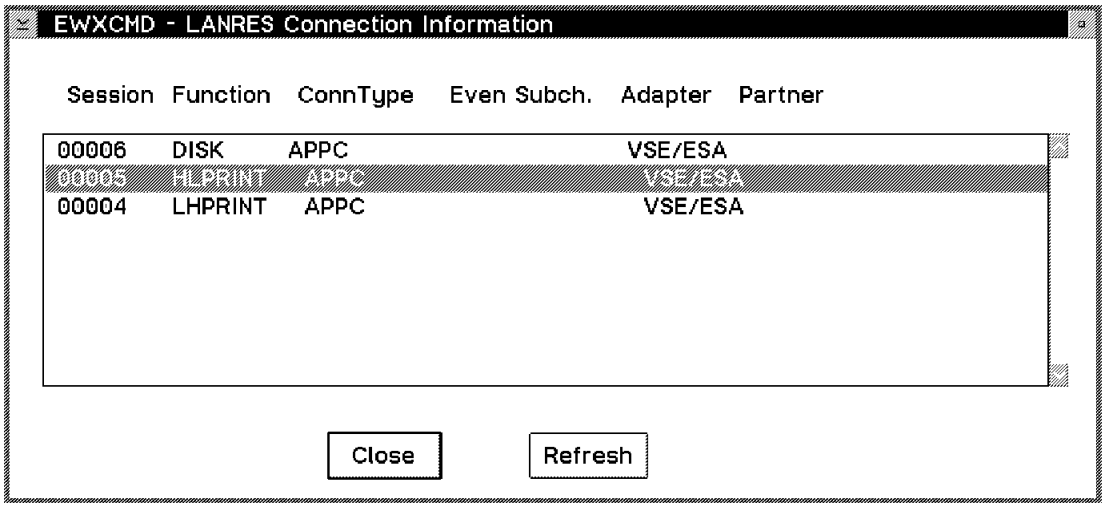

Figure 77. EWXCMD-LANRES Connection Information

8.1.7 How to Print VSE/ESA Files on an OS/2 Server Printer

To print VSE/ESA POWER list queue entries on the OS/2 LAN printer, we have to use a POWER list queue class that we had defined for the print server procedure (see the *CLASSES =* value in Figure 74 on page 98). Additionally, in the POWER '* $$ LST' statement, the DEST= parameter has to match the *TOUSER* user ID that we have specified in the EWXHLPRT.PROCS member (see Figure 73 on page 96).

In order to print a VTOC listing on our LANRES OS/2 printer, we issued the following job (Figure 78).

```
* $$ JOB JNM=VTOC,CLASS=0,DISP=D
* $$ LST CLASS=E,DEST=(*,USER1)
// JOB VTOC      Print VTOC on the LAN Printer
// ASSGN SYS004,DISK,VOL=DOSRES,SHR
// ASSGN SYS005,FEE
// EXEC LVTOC
/*
/&
* $$ EOJ
```

Figure 78. Job to Print the VTOC Report on the LAN Printer

After job completion, the output of this job is automatically taken by LANRES, converted by procedure EWXHLINE and sent down to the OS/2 server where it is printed on the printer that is locally connected to the LPT1 port.

8.2 LAN-to-Host Printing

With LAN-to-Host print serving OS/2 users can print on VSE/ESA controlled system printers via the VSE/POWER list queue.

In our environment we used a VSE/ESA line printer. To be able to print on a line printer, one of the following exits can be used:

Exit name	Description
EWXLINE	External exit (REXX/VSE procedure), translates data from ASCII to EBCDIC and adds ASA (ANSI) print control characters.
EWXASA	Internal exit with the same functionality as the external exit EWXLINE.
EWXMCC	External exit (REXX/VSE procedure), translates data from ASCII to EBCDIC and adds MCC print control characters.
EWXMCC	Internal exit with the same functionality as the external exit EWXMCC.

The following is a short comparison of the external exits versus the internal exits.

The **external exits** can be modified if necessary, that means data can be added to the print data sent from the PC, for example to add formatting information for the target printer.

The **internal exits** cannot be modified. The performance of the internal exits is much better and they need less partition GETVIS than the external exits. If you do not have the need to change the exits as they are delivered by LANRES/VSE, **you should use the internal exits!**

In our environment we used the internal exit *EWXMCC* to format the data originating from the OS/2 systems.

Additionally we used the REXX/VSE procedure **EWXPOWER.PROC** to change the VSE/POWER form number which is to be used for printing.

This is what we had to do to prepare for and start up LANRES/VSE LAN-to-Host Printing:

1. On the OS/2 server:
   a. Create one or more host printer objects on the OS/2 servers

      Each OS/2 server that will send print data to VSE/ESA must have one or more host printer objects defined. These objects assign OS/2 output ports to VSE/ESA print queues.
2. On the VSE host:
   a. Create the *EWXLHPRT.PROCS* procedures file for LAN-to-Host Printing
   b. Change the system supplied REXX exit *EWXPOWER.PROC*
   c. Create REXX procedure *EWXLHSRV.PROC* which contains LAN-to-Host Printing commands
   d. Create a job that starts the LAN-to-Host Printing
3. Start the LANRES LAN-to-Host Printing application on the OS/2 server
4. Release the job for starting up LAN-to-Host print server on the VSE/ESA host.

Let us now look at these steps in more details.

8.2.1 Creating Host Printer Object on OS/2 Server

The host printer object on the OS/2 server is the LANRES/VSE interface to a VSE printer and make it appear as a real OS/2 printer connected to the server. You can print on it as you would do on an OS/2 printer.

To create a host printer object on the OS/2 server, we did the following:

1. Open the **Templates** folder, locate the **Printer** template and drag or copy it to the OS/2 *Desktop*. Then, the *Create a Printer* window appears (see Figure 79).
2. We specified **VSE Line Printer** as the name.
3. We selected **EWXLHPR.LANRES Host Printer Driver** from the *Default printer driver* listbox. If it's not in this listbox, you have to install the driver first. For details about driver installation, refer to chapter "LAN-to-Host Print" in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624*.
4. We selected a free parallel output port, **LPT3**. Any COMn is not supported.
5. Pressing the **Create** pushbutton created the printer object on our desktop.
6. We finally opened the object's setting notebook and on the **Queue Option** page disabled the "Job Dialog before print" and "Print while spooling" option.

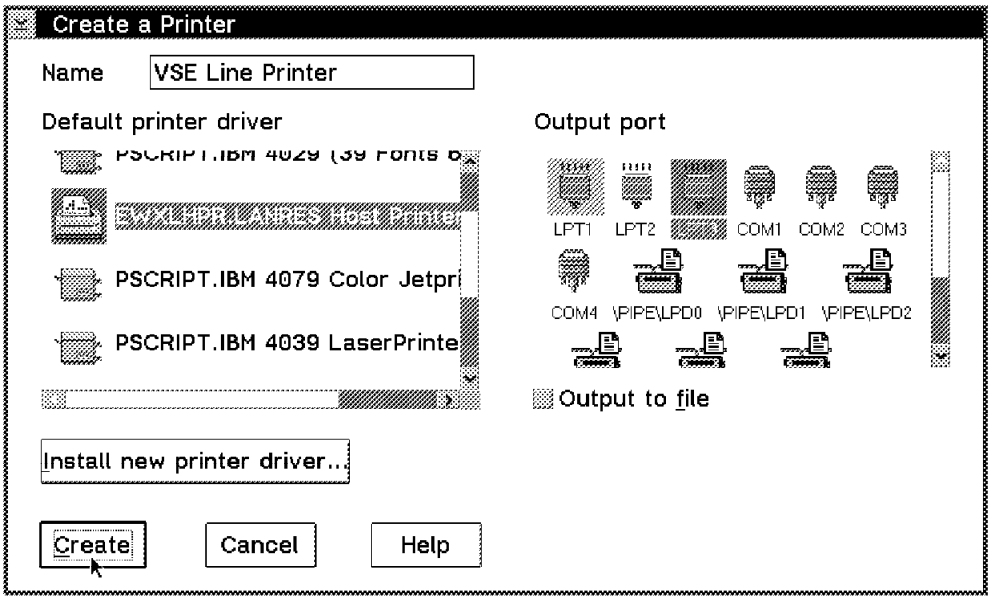

Figure 79. Create the Host Printer Object

8.2.2 Define the Host Printer as LAN Resource

In order to make our VSE/ESA host printer available to other OS/2 LAN users, we defined it as a LAN printer resource on the OS/2 server with the alias **HOSTPRT**. In the access control profile for this resource, we specified all LAN users/groups that we wanted to give access to the host printer.

LAN resources can be defined by a LAN administrator using the graphical interface *IBM LAN Services - LAN Server Administration* or using *NET* commands from an OS/2 command line.

8.2.3 Create Network Host Printer Object on OS/2 Client

To be able to use the LANRES VSE/ESA host printer from an OS/2 client system, we had to create a Network Host Printer object. This was done by the following steps:

1. Log on to the LAN domain with a user ID that has access to the OS/2 LANRES server.
2. Copy all these files from the OS/2 server into a directory on the client that is specified in the LIBPATH statement in the CONFIG.SYS:

   ```
   EWX5NPIN.CMD
   EWX5NPUN.CMD
   EWX5LHNP.DLL
   EWX5LHND.DLL
   EWXCRT2.DLL
   EWXLHPR.DRV
   ```

3. In an OS/2 command window on the client system, we entered

   ```
   EWX5NPIN.CMD
   ```

   to create the *Network Host Printer* template in the OS/2 Template folder.
4. Drag the previously created Network Host Printer template to the desktop.
5. The window *Access another Network Host Printer* pops up. We specified our OS/2 LAN server **BOEITSS1** as *Server* and our host printer **HOSTPRT** (see 8.2.2, “Define the Host Printer as LAN Resource” on page 102) as *Resource*. Then we pressed the **OK** button.
6. To install the printer driver we proceeded as described in step 3. of 8.2.1, “Creating Host Printer Object on OS/2 Server” on page 102. The only difference here is that we had to specify the directory on our client machine where the EWXLHPR.DRV resides (see step 2 above) and not the LANRES installation directory.
7. We specified **LPT3** as *Output port* and pressed the **Create** button to complete the creation of the network host printer on our OS/2 client system.

8.2.4 Create LAN-to-Host Print Procedures File EWXLHPRT.PROCS

Corresponding to the print procedures file created for the Host-to-LAN print function in 8.1.2, “Create Host-to-LAN Print Procedures File EWXHLPRT.PROCS” on page 90, we created file EWXLHPRT.PROCS for LAN-to-Host printing.
This is the entry we defined for our environment:

```
LINEPRT    EWXMCC    INTERNAL    (V
```

Figure 80. LAN-to-Host Procedure Table Entries

Notes:

- LINEPRT will be mapped to VSE/POWER list queue CLASS ′V′.
  If more than one VSE/ESA printer is required, each printer should have its own print queue entry defined on the VSE host and host printer object created on the OS/2 server.
- We used the LANRES/VSE supplied REXX procedure EWXMCC internal exit for printing on a line printer. EWXMCC converts ASCII data from the PC to EBCDIC and adds MCC print control characters.

8.2.5 Change the REXX Procedure EWXPOWER.PROC

The VSE/POWER list queue entry is by default created with disposition '**L**'. Therefore the REXX procedure **EWXPOWER.PROC** is called to change the disposition to:

- 'D' for the EWXMCC and EWXLINE external exits
- 'D' or the disposition specified in the print procedures file EWXHLPRT.PROCS for the EWXMCC and EWXASA internal exits.

Additionally this REXX procedure can be used to change any of the VSE/POWER list queue entry settings. We changed the form name of the list queue entry to use a specific form (*STAN* in our case).

This is the modified REXX procedure:

```
/*--------------------------------------------------------------------*/
/*  COPYRIGHT -                                                       */
/*    5686-066 (C) COPYRIGHT IBM CORP. - 1996, 1996                   */
/*    LICENSED MATERIALS - PROPERTY OF IBM                            */
/*    SEE COPYRIGHT INSTRUCTIONS, G120-2083                           */
/*                                                                    */
/* Purpose:                                                           */
/*   Change the settings of a VSE/POWER list queue entry.             */
/*                                                                    */
/* Dependencies:                                                      */
/*   None.                                                            */
/*                                                                    */
/* Notes:                                                             */
/*   None.                                                            */
/*                                                                    */
/* Change history:                                                    */
/*   Created          A. Stolvoort 6/96                               */
/*--------------------------------------------------------------------*/

/*--------------------------------------------------------------------*/
/*                                                                    */
/*  Invocation:                                                       */
/*                                                                    */
/*     result = ewxpower(name, number, disposition )                  */
/*                                                                    */
/*  Parameters:                                                       */
/*                                                                    */
/*    name:        The name of the entry in the list queue.          */
/*                                                                    */
/*    number:      The number of the entry in the list queue.        */
/*                                                                    */
/*    disposition: The disposition of the list queue entry.          */
/*                                                                    */
/*  Returns:                                                          */
/*                                                                    */
/*  - If no errors occured:                                           */
/*    An empty string                                                 */
/*                                                                    */
/*  - If errors occured:                                              */
/*    error_info:  INT identifier = 0xffffffff;                       */
/*                 INT last_return_code                               */
/*                 CHAR error_text•247“                               */
/*                                                                    */
/*--------------------------------------------------------------------*/
RC=ASSGN(¢STDOUT¢,¢SYSLOG¢)

Signal On halt Name errorex
Signal On syntax Name errorex

Parse Upper Arg name,number,disposition
name = strip(name)
number = strip(number)
disposition = strip(disposition)

if disposition = ¢¢ then  /* Use ¢D¢ as default disposition         */
   disposition = ¢D¢
```

Figure 81 (Part 1 of 3). REXX Procedure to Change the Setting of a List Queue Entry

```
rc = 0
t = outtrap(¢TLST.¢,¢*¢,¢NOCONCAT¢)   /* Set stem variable           */
if number = ¢ ¢ then
Address POWER ¢PALTER LST,¢name¢,DISP=¢disposition¢,FNO=STAN¢
else
Address POWER ¢PALTER LST,¢name¢,¢number¢,DISP=¢disposition¢,FNO=STAN¢
If (rc <> 0) Then
   Call error rc,tlst.1
If (c.error <> ¢YES¢) Then            /* No error return             */
   Return ††
Else                                  /* Error return                */
   Return ¢FFFFFFFF¢x||c.error_rc||c.error_msg

error: Procedure Expose c. cspool.
/*-------------------------------------------------------------------*/
/*                          Error:                                   */
/*-------------------------------------------------------------------*/
 Parse Arg xrc , msg
 h = ¢Error in routine ¢c.routine_name¢:¢c.cr
 new_msg = h||form_message(3,msg)
 Call isay 1,new_msg
 c.error = ¢YES¢
 c.error_rc = xrc
 c.error_msg = c.error_msg||new_msg
 Return xrc


errorex:
/*-------------------------------------------------------------------*/
/*                     REXX detected errors:                         */
/*-------------------------------------------------------------------*/
 error_line_number = sigl
 error_msg = ¢No Rexx error code available.¢
 If (Datatype(rc,¢whole¢) & (rc >= 0) & (rc <= 99)) Then
    error_msg = Errortext(rc)
 error_line = Sourceline(error_line_number)
 msg = error_msg¢.¢c.cr
 msg = msg ¢At line † ¢error_line¢ †.¢c.cr
 msg = msg ¢Line number ¢error_line_number¢.¢c.cr

form_message: Procedure Expose c. cspool.
/*-------------------------------------------------------------------*/
/*                 Format an error messgage:                         */
/*-------------------------------------------------------------------*/
 Parse Arg offset,msg
 If (Datatype(offset,¢whole¢) <> 1) Then
    offset = 3
 r = ¢¢
 Do While (msg <> ¢¢)
    Parse Value msg With text (c.cr) msg
    r = r||Copies(¢ ¢,offset)||Strip(text) c.cr
    End
 Return r
```

Figure 81 (Part 2 of 3). REXX Procedure to Change the Setting of a List Queue Entry

```
isay: Procedure Expose c. cspool.
/*--------------------------------------------------------------------*/
/*                    Display messages:                               */
/*--------------------------------------------------------------------*/
 Parse Arg level,msg
 If (level <= c.message_level) Then
    Say msg
 Return
```

Figure 81 (Part 3 of 3). REXX Procedure to Change the Setting of a List Queue Entry

8.2.6 Create REXX Procedure for LAN-to-Host Print Server Startup

We used the following job to catalog the REXX procedure for starting up the LAN-to-Host print server:

```
* $$ JOB JNM=LHSRV,CLASS=C,DISP=D
* $$ LST CLASS=A,DISP=D
// JOB LHSRV   CATALOG THE REXX/VSE PROCEDURE EWXLHSRV.PROC
// EXEC LIBR
   ACC S=PRD2.LANAPPL
   CATALOG EWXLHSRV.PROC EOD=XY R=Y
 comm_protocol = ¢APPC¢          /* Specify either APPC or CHANNEL */
 if comm_protocol = ¢APPC¢ then
    target = ¢OS2LU2¢            /* LU NAME OF THE SERVER          */
 else
    target = ¢946¢               /* Channel address                */

 pwin = ¢UP¢                     /* Specify a component password   */
 pwout = ¢DOWN¢                  /* Specify a component password   */

 rc=EWXVSE2(¢EWXLHSRV ( ¢ comm_protocol target,
 ¢ PWIN ¢ pwin ¢ PWOUT ¢ pwout )
 exit(rc)
XY
/*
/&
* $$ EOJ
```

Figure 82. Catalog LANRES/VSE LAN-to-Host Print Server Startup Procedure

Notes:

- Options *comm_protocol* and *target* specify the communication method and the LU name of the OS/2 server, which in our case are **APPC** and **OS2LU2**. See, for example, 4.2.2, “APPC Connection” on page 39.
  Refer to LANRES/VSE commands in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624* for more details on the EWXLHSRV command.

8.2.7 Create LANRES/VSE LAN-to-Host Printing Startup Job

We created the following job for starting up the LAN-to-Host Print Server (see Figure 83):

```
* $$ JOB JNM=EWXLHSRV,CLASS=8,DISP=L
// JOB EWXLHSRV       CALL THE REXX PROCEDURE
// LIBDEF *,SEARCH=(PRD2.LANRES,PRD2.LANAPPL)
/. X Specify either CHANNEL or APPC
// SETPARM COMM=APPC
// IF COMM=CHANNEL THEN
// SETPFIX LIMIT=16K
// EXEC REXX=EWXLHSRV
/*
/&
* $$ EOJ
```

Figure 83. Catalog LANRES/VSE LAN-to-Host Print Server Startup Job

8.2.8 Start Up LAN-to-Host Printing at the OS/2 Server

Make sure that the LANRES communication (EWXCOMM) is started on the OS/2 server (see Figure 22 on page 36).

Start the LANRES LAN-to-Host Print application on the OS/2 server using the OS/2 command line interface (start **EWXLHPRT**) or double-click the **Host Printing** icon. See Figure 22 on page 36.

Note

The IN password which is defined for Host Printing on OS/2 server should match PWOUT specified in Figure 82 on page 107 while the OUT password should match PWIN.

8.2.9 Start Up LAN-to-Host Print Server on VSE/ESA

- If you are using an APPC connection you first have to make sure that the APPC server on VSE/ESA (see Figure 20 on page 31) has been started.
- Start the LANRES LAN-to-Host Print application on VSE/ESA. We released our job **EWXLHSRV** (see 8.2.7, “Create LANRES/VSE LAN-to-Host Printing Startup Job”) in the POWER reader queue. As a result, the following messages were displayed on the VSE/ESA console:

```
R RDR,EWXLHSRV
AR 0015 1C39I COMMAND PASSED TO VSE/POWER
F1 0001 1R88I  OK
F6 0001 1Q47I   F6 EWXLHSRV 09671 FROM (SYSA) , TIME=16:44:50
F6 0006 // JOB EWXLHSRV       CALL THE REXX PROCEDURE
        DATE 12/14/96,CLOCK 16/44/50
F6 0006 EWXPLH1021I USING THE DEFAULT PRINT SERVER NAME, HOSTPRT.
F6 0006 EWXPLH4054I APPC CONNECTION THROUGH PC_SERVER ESTABLISHED TO LHPRT
FUNCTION.
F6 0006 EWXPLH4012I CONNECTION ESTABLISHED TO THE LHPRT FUNCTION ON THE
SERVER.
F6 0006 EWXPLH1002I LAN-TO-HOST PRINT FUNCTION INITIALIZATION COMPLETED.
```

The LAN-to-Host Printing server procedure EWXHLSRV remains running in the VSE/ESA partition until it is terminated explicitly by the VSE/ESA console command **MSG xx,DATA=STOP** (**xx** is the partition ID in which the EWXHLSRV is running).

On the OS/2 server we used the **Status Information** icon in the LANRES folder to check the current status/connection of the LAN-to-Host print function LHPRINT (see Figure 77 on page 100).

8.2.10 How to Print OS/2 Files on a VSE/ESA Printer

After these steps, we could print directly from our OS/2 server or from attached OS/2 LAN clients' systems to the VSE/ESA system printer.

- Print files from OS/2 server

  We can print on an VSE/ESA controlled line printer by either of the following two ways:

  1. Use the OS/2 commands **PRINT** or **COPY** to send a print file to the output port which is assigned to the host printer object. For example:

     ```
     print /d:lpt3 c:\autoexec.bat
     or
     copy c:\autoexec.bat lpt3
     ```

  2. Drag and drop a printable OS/2 object on the host printer object.

- Print files from OS/2 LAN client

  Since we defined the VSE/ESA printer as an OS/2 LAN resource, we could also print from a client OS/2 system by doing the following:

  1. Log on to the LAN domain using a user ID with access rights to the printer resource HOSTPRT.
  2. In an OS/2 window, enter the following command to specify the LAN resource HOSTPRT as output port LPT3 on the LAN client system:

     ```
     NET USE LPT3: \\BOEITSS1\HOSTPRT
     ```

  3. Then we could print in the same two ways as from the OS/2 LAN server:
     - Use **PRINT** or **COPY** commands in the same way as on the OS/2 server.
     - Drag and drop a file on the Network Host Printer object.

On the VSE host, LANRES puts the OS/2 file into the VSE/POWER list queue (Figure 84) with the CLASS that we specified for our host printer LINEPRT in the EWXLHPRT.PROCS procedures file (see 8.2.4, "Create LAN-to-Host Print Procedures File EWXLHPRT.PROCS" on page 103).

```
IESBQUL                          LIST QUEUE                Page  1 of 1
                                                        Prefix: NOV
OPTIONS:   1 = DISPLAY     2 = CHANGE       3 = PRINT      5 = DELETE

OPT JOBNAME NUMBER SFX S PR DIS CL   PAGES  CC FORM TO      FROM

 _  AUTOEXEC 09676       3  D  V       1   1              .SYSA
```

Figure 84. VSE/ESA POWER List Queue

In order to print all the VSE/ESA POWER list queue entries in CLASS ′V′ immediately on the VSE/ESA system printer, the VSE/ESA printer must have been started previously for this class.

Chapter 9. Using the LANRES/VSE Translate Table

This chapter provides some information on how to use the LANRES/VSE supplied ASCII/EBCDIC translate tables for Host-to-LAN and LAN-to-Host printing and Distribution and Administration in both directions.
See chapter ″Changing the Default Translate Table″ in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624* for more information on this subject.

We changed one of the supplied tables (*EWXENGX*) and converted data in both directions, that is, from and to an OS/2 client on an IBM PS/2 workstation.

This is what you have to do if you want to use your own translate table:

1. Check which codepages are used on the VSE host and the OS/2 client
2. Select the corresponding LANRES/VSE translate table
3. Change translate table characters according to your requirements
4. Compile and link the translate table
5. On VSE/ESA, change the EWXCOMM.INI file to include the phasename
6. Change the EWXCOMM.INI file to include the phasename of the changed translate table
7. Start the LANRES/VSE application which uses the changed translate table

Let us look at these steps in more detail.

9.1 Check for Codepages

Two of the standard codepages (for English speaking countries) are:

- codepage 850 on PS/2s
- codepage 037 on the VSE host

These were the codepages we used.

9.2 Select LANRES/VSE Translate Tables

Chapter ″Changing the Default Translate Table″ in *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624* lists the translate tables provided by LANRES/VSE. The tables are stored as source books in the LANRES installation sublibrary with member type **Z**.
The default translate table is EWXLATE.

According to the codepages we use, we select translate table *EWXENG2*.

9.3 Change Translate Table Characters

This is how we changed the characters we wanted to change:

1. We punched book EWXENG2.Z into ICCF or to VM/CMS as ′EWXENGX′.
2. Just for demonstration purposes we changed an uppercase ASCII ′A′ to an EBDCIC uppercase ′X′ and vice versa. This is shown in Figure 85 on page 112.

```
         TITLE ¢EWXENGX - US ENGLISH 037/850 TRANSLATE TABLES¢
*--------------------------------------------------------------------*
*                                                                    *
* COPYRIGHT -                                                        *
*    5686-066 (C) COPYRIGHT IBM CORP. - 1995, 1996                   *
*    LICENSED MATERIALS - PROPERTY OF IBM                            *
*    SEE COPYRIGHT INSTRUCTIONS, G120-2083                           *
*    ALL RIGHTS RESERVED.                                            *
*                                                                    *
* Purpose:                                                           *
*   Data translate tables which can be modified by the customer.     *
*                                                                    *
* Dependencies:                                                      *
*   1. The load module entry point must be XLATVTBL.                 *
*   2. The load module must be generated as reentrant and reusable.  *
*                                                                    *
* Notes:                                                             *
*   1. The SASCEBC and SEBCASC translate tables are used for         *
*      single-byte translations.                                     *
*   2. The DASCEBC and DEBCASC translate tables are used for         *
*      double-byte translations.  These tables are present only      *
*      for DBCS languages and are not used for SBCS languages.       *
*   3. The CTYPE tables are used for SBCS characters only.  There    *
*      is no DBCS equivalent.                                        *
*--------------------------------------------------------------------*
         SPACE 1
EWXENGX  START 0
EWXENGX  RMODE 24
EWXENGX  AMODE 24
         PRINT GEN,DATA
         DC    CL28¢EWXENGX  -  &SYSDATE &SYSTIME¢
* Fix offset to XLATVTBL in VSE, because table is CDLOAD¢ed.
         SPACE 1
*       ************************************************************
*       *  Translation vector table - Do not make any changes      *
*       ************************************************************
         SPACE 1
         ENTRY XLATVTBL
XLATVTBL DC    A(CTYPE)           C SBCS character type tables
         DC    A(SASCEBC)         SBCS ASCII-to-EBCDIC table
         DC    A(SEBCASC)         SBCS EBCDIC-to-ASCII table
         DC    A(DASCEBC)         DBCS ASCII-to-EBCDIC table
         DC    A(DEBCASC)         DBCS EBCDIC-to-ASCII table
         DC    A(DBCSRNGS)        ASCII DBCS range table
         DC    A(DBCSLNG)         DBCS language indicator
         DC    A(LANGID)          Language identifier
         DC    F¢-1¢              Fence
         SPACE 1
*       ************************************************************
*       *  Control variables                                       *
*       ************************************************************
         SPACE 1
DBCSLNG  DC    F¢0¢               0 = SBCS, 1 = DBCS
```

Figure 85 (Part 1 of 6). Sample Translate Table with Changes

```
LANGID   DC    CL3¢ENU¢,X¢00¢      Language identifier (3 characters)
         EJECT ,
*************************************************************************
*       Character type table plus uppercase/lowercase translations    *
*************************************************************************
         SPACE 1
B        EQU  X¢0200¢                    /* Forward/backward slash */
A        EQU  X¢0100¢                    /* Alphabetic */
U        EQU  X¢0080¢                    /* Uppercase */
L        EQU  X¢0040¢                    /* Lowercase */
C        EQU  X¢0020¢                    /* Control */
P        EQU  X¢0010¢                    /* Punctuation */
W        EQU  X¢0008¢                    /* White space */
S        EQU  X¢0004¢                    /* Space */
D        EQU  X¢0002¢                    /* Numeric digit */
X        EQU  X¢0001¢                    /* Hexadecimal digit */
         SPACE 1
CTYPE    DS    0H
         SPACE 1
*        *-------------------------------------------------------------*
*        *  Define the character type values                          *
*        *-------------------------------------------------------------*
         SPACE 1
 DC AL2(C,C,C,C,C,C+W,C,C)                                    /*00-07*/
 DC AL2(C,C,C,C+W,C+W,C+W,C,C)                                /*08-0F*/
 DC AL2(C,C,C,C,C,C+W,C,C)                                    /*10-17*/
 DC AL2(C,C,C,C,C,C,C,C)                                      /*18-1F*/
 DC AL2(C,C,C,C,C,C,C,C)                                      /*20-27*/
 DC AL2(C,0,C,C,C,C,C,C)                                      /*28-2F*/
 DC AL2(0,0,C,C,C,C,C,C)                                      /*30-37*/
 DC AL2(C,C,C,C,C,C,0,C)                                      /*38-3F*/
 DC AL2(W+S,0,A,A,A,A,A,A)                                    /*40-47*/
 DC AL2(A,A,P,P,P,P,P,P)                                      /*48-4F*/
 DC AL2(P,A,A,A,A,A,A,A)                                      /*50-57*/
 DC AL2(A,0,P,P,P,P,P,P)                                      /*58-5F*/
 DC AL2(P,P+B,A,A,A,A,A,A)                                    /*60-67*/
 DC AL2(A,A,P,P,P,P,P,P)                                      /*68-6F*/
 DC AL2(0,A,A,A,A,A,A,A)                                      /*70-77*/
 DC AL2(A,P,P,P,P,P,P,P)                                      /*78-7F*/
 DC AL2(0,A+L+X,A+L+X,A+L+X)                                  /*80-83*/
 DC AL2(A+L+X,A+L+X,A+L+X,A+L)                                /*84-87*/
 DC AL2(A+L,A+L,0,0,0,A,0,0)                                  /*88-8F*/
 DC AL2(0,A+L,A+L,A+L,A+L,A+L,A+L,A+L)                        /*90-97*/
 DC AL2(A+L,A+L,0,0,0,0,0,0)                                  /*98-9F*/
 DC AL2(0,P,A+L,A+L,A+L,A+L,A+L,A+L)                          /*A0-A7*/
 DC AL2(A+L,A+L,0,0,0,A,0,0)                                  /*A8-AF*/
 DC AL2(0,0,0,0,0,0,0,0)                                      /*B0-B7*/
 DC AL2(0,0,0,0,0,0,0,0)                                      /*B8-BF*/
 DC AL2(P,A+U+X,A+U+X,A+U+X)                                  /*C0-C3*/
 DC AL2(A+U+X,A+U+X,A+U+X,A+U)                                /*C4-C7*/
 DC AL2(A+U,A+U,P,A,A,A,A,A)                                  /*C8-CF*/
 DC AL2(P,A+U,A+U,A+U,A+U,A+U,A+U,A+U)                        /*D0-D7*/
 DC AL2(A+U,A+U,0,A,A,A,A,A)                                  /*D8-DF*/
 DC AL2(0,0,A+U,A+U,A+U,A+U,A+U,A+U)                          /*E0-/e7/
```

Figure 85 (Part 2 of 6). Sample Translate Table with Changes

```
 DC AL2(A+U,A+U,0,A,A,A,A,A)                                    /*E8-EF*/
 DC AL2(D+X,D+X,D+X,D+X)                                        /*F0-F3*/
 DC AL2(D+X,D+X,D+X,D+X)                                        /*F4-F7*/
 DC AL2(D+X,D+X,0,A,A,A,A,0)                                    /*F8-FF*/
         SPACE 1
 DC AL2(-1)                              /* End of table segment */
         SPACE 1
*       *-------------------------------------------------------*
*       *  Define the uppercase conversion values               *
*       *-------------------------------------------------------*
         SPACE 1
 DC AL2(X¢00¢,X¢01¢,X¢02¢,X¢03¢,X¢04¢,X¢05¢,X¢06¢,X¢07¢)      /*00-07*/
 DC AL2(X¢08¢,X¢09¢,X¢0A¢,X¢0B¢,X¢0C¢,X¢0D¢,X¢0E¢,X¢0F¢)      /*08-0F*/
 DC AL2(X¢10¢,X¢11¢,X¢12¢,X¢13¢,X¢14¢,X¢15¢,X¢16¢,X¢17¢)      /*10-17*/
 DC AL2(X¢18¢,X¢19¢,X¢1A¢,X¢1B¢,X¢1C¢,X¢1D¢,X¢1E¢,X¢1F¢)      /*18-1F*/
 DC AL2(X¢20¢,X¢21¢,X¢22¢,X¢23¢,X¢24¢,X¢25¢,X¢26¢,X¢27¢)      /*20-27*/
 DC AL2(X¢28¢,X¢29¢,X¢2A¢,X¢2B¢,X¢2C¢,X¢2D¢,X¢2E¢,X¢2F¢)      /*28-2F*/
 DC AL2(X¢30¢,X¢31¢,X¢32¢,X¢33¢,X¢34¢,X¢35¢,X¢36¢,X¢37¢)      /*30-37*/
 DC AL2(X¢38¢,X¢39¢,X¢3A¢,X¢3B¢,X¢3C¢,X¢3D¢,X¢3E¢,X¢3F¢)      /*38-3F*/
 DC AL2(X¢40¢,X¢41¢,X¢42¢,X¢43¢,X¢44¢,X¢45¢,X¢46¢,X¢47¢)      /*40-47*/
 DC AL2(X¢48¢,X¢49¢,X¢4A¢,X¢4B¢,X¢4C¢,X¢4D¢,X¢4E¢,X¢4F¢)      /*48-4F*/
 DC AL2(X¢50¢,X¢51¢,X¢52¢,X¢53¢,X¢54¢,X¢55¢,X¢56¢,X¢57¢)      /*50-57*/
 DC AL2(X¢58¢,X¢59¢,X¢5A¢,X¢5B¢,X¢5C¢,X¢5D¢,X¢5E¢,X¢5F¢)      /*58-5F*/
 DC AL2(X¢60¢,X¢61¢,X¢62¢,X¢63¢,X¢64¢,X¢65¢,X¢66¢,X¢67¢)      /*60-67*/
 DC AL2(X¢68¢,X¢69¢,X¢6A¢,X¢6B¢,X¢6C¢,X¢6D¢,X¢6E¢,X¢6F¢)      /*68-6F*/
 DC AL2(X¢70¢,X¢71¢,X¢72¢,X¢73¢,X¢74¢,X¢75¢,X¢76¢,X¢77¢)      /*70-77*/
 DC AL2(X¢78¢,X¢79¢,X¢7A¢,X¢7B¢,X¢7C¢,X¢7D¢,X¢7E¢,X¢7F¢)      /*78-7F*/
 DC AL2(X¢80¢,X¢C1¢,X¢C2¢,X¢C3¢,X¢C4¢,X¢C5¢,X¢C6¢,X¢C7¢)      /*80-8X7*/
 DC AL2(X¢C8¢,X¢C9¢,X¢8A¢,X¢8B¢,X¢8C¢,X¢8D¢,X¢8E¢,X¢8F¢)      /*88-8F*/
 DC AL2(X¢90¢,X¢D1¢,X¢D2¢,X¢D3¢,X¢D4¢,X¢D5¢,X¢D6¢,X¢D7¢)      /*90-97*/
 DC AL2(X¢D8¢,X¢D9¢,X¢9A¢,X¢9B¢,X¢9C¢,X¢9D¢,X¢9E¢,X¢9F¢)      /*98-9F*/
 DC AL2(X¢A0¢,X¢A1¢,X¢E2¢,X¢E3¢,X¢E4¢,X¢E5¢,X¢E6¢,X¢E7¢)      /*A0-A7*/
 DC AL2(X¢E8¢,X¢E9¢,X¢AA¢,X¢AB¢,X¢AC¢,X¢AD¢,X¢AE¢,X¢AF¢)      /*A8-AF*/
 DC AL2(X¢B0¢,X¢B1¢,X¢B2¢,X¢B3¢,X¢B4¢,X¢B5¢,X¢B6¢,X¢B7¢)      /*B0-B7*/
 DC AL2(X¢B8¢,X¢B9¢,X¢BA¢,X¢BB¢,X¢BC¢,X¢BD¢,X¢BE¢,X¢BF¢)      /*B8-BF*/
 DC AL2(X¢C0¢,X¢C1¢,X¢C2¢,X¢C3¢,X¢C4¢,X¢C5¢,X¢C6¢,X¢C7¢)      /*C0-C7*/
 DC AL2(X¢C8¢,X¢C9¢,X¢CA¢,X¢CB¢,X¢CC¢,X¢CD¢,X¢CE¢,X¢CF¢)      /*C8-CF*/
 DC AL2(X¢D0¢,X¢D1¢,X¢D2¢,X¢D3¢,X¢D4¢,X¢D5¢,X¢D6¢,X¢D7¢)      /*D0-D0*/
 DC AL2(X¢D8¢,X¢D9¢,X¢DA¢,X¢DB¢,X¢DC¢,X¢DD¢,X¢DE¢,X¢DF¢)      /*D8-DF*/
 DC AL2(X¢E0¢,X¢E1¢,X¢E2¢,X¢E3¢,X¢E4¢,X¢E5¢,X¢E6¢,X¢E7¢)      /*E0-E7*/
 DC AL2(X¢E8¢,X¢E9¢,X¢EA¢,X¢EB¢,X¢EC¢,X¢ED¢,X¢EE¢,X¢EF¢)      /*E8-EF*/
 DC AL2(X¢F0¢,X¢F1¢,X¢F2¢,X¢F3¢,X¢F4¢,X¢F5¢,X¢F6¢,X¢F7¢)      /*F0-F7*/
 DC AL2(X¢F8¢,X¢F9¢,X¢FA¢,X¢FB¢,X¢FC¢,X¢FD¢,X¢FE¢,X¢FF¢)      /*F8-FF*/
         SPACE 1
 DC AL2(-1)                              /* End of table segment */
         SPACE 1
*       *-------------------------------------------------------*
*       *  Define the lowercase conversion values               *
*       *-------------------------------------------------------*
         SPACE 1
 DC AL2(X¢00¢,X¢01¢,X¢02¢,X¢03¢,X¢04¢,X¢05¢,X¢06¢,X¢07¢)      /*00-07*/
 DC AL2(X¢08¢,X¢09¢,X¢0A¢,X¢0B¢,X¢0C¢,X¢0D¢,X¢0E¢,X¢0F¢)      /*08-0F*/
 DC AL2(X¢10¢,X¢11¢,X¢12¢,X¢13¢,X¢14¢,X¢15¢,X¢16¢,X¢17¢)      /*10-17*/
 DC AL2(X¢18¢,X¢19¢,X¢1A¢,X¢1B¢,X¢1C¢,X¢1D¢,X¢1E¢,X¢1F¢)      /*18-1F*/
```

Figure 85 (Part 3 of 6). Sample Translate Table with Changes

```
 DC AL2(X¢20¢,X¢21¢,X¢22¢,X¢23¢,X¢24¢,X¢25¢,X¢26¢,X¢27¢)      /*20-27*/
 DC AL2(X¢28¢,X¢29¢,X¢2A¢,X¢2B¢,X¢2C¢,X¢2D¢,X¢2E¢,X¢2F¢)      /*28-2F*/
 DC AL2(X¢30¢,X¢31¢,X¢32¢,X¢33¢,X¢34¢,X¢35¢,X¢36¢,X¢37¢)      /*30-37*/
 DC AL2(X¢38¢,X¢39¢,X¢3A¢,X¢3B¢,X¢3C¢,X¢3D¢,X¢3E¢,X¢3F¢)      /*38-3F*/
 DC AL2(X¢40¢,X¢41¢,X¢42¢,X¢43¢,X¢44¢,X¢45¢,X¢46¢,X¢47¢)      /*40-47*/
 DC AL2(X¢48¢,X¢49¢,X¢4A¢,X¢4B¢,X¢4C¢,X¢4D¢,X¢4E¢,X¢4F¢)      /*48-4F*/
 DC AL2(X¢50¢,X¢51¢,X¢52¢,X¢53¢,X¢54¢,X¢55¢,X¢56¢,X¢57¢)      /*50-57*/
 DC AL2(X¢58¢,X¢59¢,X¢5A¢,X¢5B¢,X¢5C¢,X¢5D¢,X¢5E¢,X¢5F¢)      /*58-5F*/
 DC AL2(X¢60¢,X¢61¢,X¢62¢,X¢63¢,X¢64¢,X¢65¢,X¢66¢,X¢67¢)      /*60-67*/
 DC AL2(X¢68¢,X¢69¢,X¢6A¢,X¢6B¢,X¢6C¢,X¢6D¢,X¢6E¢,X¢6F¢)      /*68-6F*/
 DC AL2(X¢70¢,X¢71¢,X¢72¢,X¢73¢,X¢74¢,X¢75¢,X¢76¢,X¢77¢)      /*70-77*/
 DC AL2(X¢78¢,X¢79¢,X¢7A¢,X¢7B¢,X¢7C¢,X¢7D¢,X¢7E¢,X¢7F¢)      /*78-7F*/
 DC AL2(X¢80¢,X¢81¢,X¢82¢,X¢83¢,X¢84¢,X¢85¢,X¢86¢,X¢87¢)      /*80-87*/
 DC AL2(X¢88¢,X¢89¢,X¢8A¢,X¢8B¢,X¢8C¢,X¢8D¢,X¢8E¢,X¢8F¢)      /*88-8F*/
 DC AL2(X¢90¢,X¢91¢,X¢92¢,X¢93¢,X¢94¢,X¢95¢,X¢96¢,X¢97¢)      /*90-97*/
 DC AL2(X¢98¢,X¢99¢,X¢9A¢,X¢9B¢,X¢9C¢,X¢9D¢,X¢9E¢,X¢9F¢)      /*98-9F*/
 DC AL2(X¢A0¢,X¢A1¢,X¢A2¢,X¢A3¢,X¢A4¢,X¢A5¢,X¢A6¢,X¢A7¢)      /*A0-A7*/
 DC AL2(X¢A8¢,X¢A9¢,X¢AA¢,X¢AB¢,X¢AC¢,X¢AD¢,X¢AE¢,X¢AF¢)      /*A8-AF*/
 DC AL2(X¢B0¢,X¢B1¢,X¢B2¢,X¢B3¢,X¢B4¢,X¢B5¢,X¢B6¢,X¢B7¢)      /*B0-B7*/
 DC AL2(X¢B8¢,X¢B9¢,X¢BA¢,X¢BB¢,X¢BC¢,X¢BD¢,X¢BE¢,X¢BF¢)      /*B8-BF*/
 DC AL2(X¢C0¢,X¢81¢,X¢82¢,X¢83¢,X¢84¢,X¢85¢,X¢86¢,X¢87¢)      /*C0-C7*/
 DC AL2(X¢88¢,X¢89¢,X¢CA¢,X¢CB¢,X¢CC¢,X¢CD¢,X¢CE¢,X¢CF¢)      /*C8-CF*/
 DC AL2(X¢D0¢,X¢91¢,X¢92¢,X¢93¢,X¢94¢,X¢95¢,X¢96¢,X¢97¢)      /*D0-D7*/
 DC AL2(X¢98¢,X¢99¢,X¢DA¢,X¢DB¢,X¢DC¢,X¢DD¢,X¢DE¢,X¢DF¢)      /*D8-DF*/
 DC AL2(X¢E0¢,X¢E1¢,X¢A2¢,X¢A3¢,X¢A4¢,X¢A5¢,X¢A6¢,X¢A7¢)      /*E0-E7*/
 DC AL2(X¢A8¢,X¢A9¢,X¢EA¢,X¢EB¢,X¢EC¢,X¢ED¢,X¢EE¢,X¢EF¢)      /*E8-EF*/
 DC AL2(X¢F0¢,X¢F1¢,X¢F2¢,X¢F3¢,X¢F4¢,X¢F5¢,X¢F6¢,X¢F7¢)      /*F0-F7*/
 DC AL2(X¢F8¢,X¢F9¢,X¢FA¢,X¢FB¢,X¢FC¢,X¢FD¢,X¢FE¢,X¢FF¢)      /*F8-FF*/
        EJECT ,
*********************************************************************
*       SBCS ASCII-to-EBCDIC translate table                        *
*********************************************************************
        SPACE 1
 SASCEBC   DS    0X
 DC AL1(X¢00¢,X¢01¢,X¢02¢,X¢03¢,X¢37¢,X¢2D¢,X¢2E¢,X¢2F¢)    /* 00-07 */
 DC AL1(X¢16¢,X¢05¢,X¢25¢,X¢0B¢,X¢0C¢,X¢0D¢,X¢0E¢,X¢0F¢)    /* 08-0F */
 DC AL1(X¢10¢,X¢11¢,X¢12¢,X¢13¢,X¢3C¢,X¢3D¢,X¢32¢,X¢26¢)    /* 10-17 */
 DC AL1(X¢18¢,X¢19¢,X¢1C¢,X¢27¢,X¢07¢,X¢1D¢,X¢1E¢,X¢1F¢)    /* 18-1F */
 DC AL1(X¢40¢,X¢5A¢,X¢7F¢,X¢7B¢,X¢5B¢,X¢6C¢,X¢50¢,X¢7D¢)    /* 20-27 */
 DC AL1(X¢4D¢,X¢5D¢,X¢5C¢,X¢4E¢,X¢6B¢,X¢60¢,X¢4B¢,X¢61¢)    /* 28-2F */
 DC AL1(X¢F0¢,X¢F1¢,X¢F2¢,X¢F3¢,X¢F4¢,X¢F5¢,X¢F6¢,X¢F7¢)    /* 30-37 */
 DC AL1(X¢F8¢,X¢F9¢,X¢7A¢,X¢5E¢,X¢4C¢,X¢7E¢,X¢6E¢,X¢6F¢)    /* 38-3F */
 DC AL1(X¢7C¢, X¢E7¢ ,X¢C2¢,X¢C3¢,X¢C4¢,X¢C5¢,X¢C6¢,X¢C7¢)  /* 40-47X*/
 DC AL1(X¢C8¢,X¢C9¢,X¢D1¢,X¢D2¢,X¢D3¢,X¢D4¢,X¢D5¢,X¢D6¢)    /* 48-4F */
 DC AL1(X¢D7¢,X¢D8¢,X¢D9¢,X¢E2¢,X¢E3¢,X¢E4¢,X¢E5¢,X¢E6¢)    /* 50-57 */
 DC AL1(X¢E7¢,X¢E8¢,X¢E9¢,X¢BA¢,X¢E0¢,X¢BB¢,X¢B0¢,X¢6D¢)    /* 58-5F */
 DC AL1(X¢79¢,X¢81¢,X¢82¢,X¢83¢,X¢84¢,X¢85¢,X¢86¢,X¢87¢)    /* 60-67 */
 DC AL1(X¢88¢,X¢89¢,X¢91¢,X¢92¢,X¢93¢,X¢94¢,X¢95¢,X¢96¢)    /* 68-6F */
 DC AL1(X¢97¢,X¢98¢,X¢99¢,X¢A2¢,X¢A3¢,X¢A4¢,X¢A5¢,X¢A6¢)    /* 70-77 */
 DC AL1(X¢A7¢,X¢A8¢,X¢A9¢,X¢C0¢,X¢4F¢,X¢D0¢,X¢A1¢,X¢3F¢)    /* 78-7F */
 DC AL1(X¢68¢,X¢DC¢,X¢51¢,X¢42¢,X¢43¢,X¢44¢,X¢47¢,X¢48¢)    /* 80-87 */
 DC AL1(X¢52¢,X¢53¢,X¢54¢,X¢57¢,X¢56¢,X¢58¢,X¢63¢,X¢67¢)    /* 88-8F */
 DC AL1(X¢71¢,X¢9C¢,X¢9E¢,X¢CB¢,X¢CC¢,X¢CD¢,X¢DB¢,X¢DD¢)    /* 90-97 */
 DC AL1(X¢DF¢,X¢EC¢,X¢FC¢,X¢70¢,X¢B1¢,X¢80¢,X¢BF¢,X¢FF¢)    /* 98-9F */
```

Figure 85 (Part 4 of 6). Sample Translate Table with Changes

```
 DC AL1(X¢45¢,X¢55¢,X¢CE¢,X¢DE¢,X¢49¢,X¢69¢,X¢9A¢,X¢9B¢)    /* A0-A7 */
 DC AL1(X¢AB¢,X¢AF¢,X¢5F¢,X¢B8¢,X¢B7¢,X¢AA¢,X¢8A¢,X¢8B¢)    /* A8-AF */
 DC AL1(X¢2B¢,X¢2C¢,X¢09¢,X¢21¢,X¢28¢,X¢65¢,X¢62¢,X¢64¢)    /* B0-B7 */
 DC AL1(X¢B4¢,X¢38¢,X¢31¢,X¢34¢,X¢33¢,X¢4A¢,X¢B2¢,X¢24¢)    /* B8-BF */
 DC AL1(X¢22¢,X¢17¢,X¢29¢,X¢06¢,X¢20¢,X¢2A¢,X¢46¢,X¢66¢)    /* C0-C7 */
 DC AL1(X¢1A¢,X¢35¢,X¢08¢,X¢39¢,X¢36¢,X¢30¢,X¢3A¢,X¢9F¢)    /* C8-CF */
 DC AL1(X¢8C¢,X¢AC¢,X¢72¢,X¢73¢,X¢74¢,X¢0A¢,X¢75¢,X¢76¢)    /* D0-D7 */
 DC AL1(X¢77¢,X¢23¢,X¢15¢,X¢14¢,X¢04¢,X¢6A¢,X¢78¢,X¢3B¢)    /* D8-DF */
 DC AL1(X¢EE¢,X¢59¢,X¢EB¢,X¢ED¢,X¢CF¢,X¢EF¢,X¢A0¢,X¢8E¢)    /* E0-E7 */
 DC AL1(X¢AE¢,X¢FE¢,X¢FB¢,X¢FD¢,X¢8D¢,X¢AD¢,X¢BC¢,X¢BE¢)    /* E8-EF */
 DC AL1(X¢CA¢,X¢8F¢,X¢1B¢,X¢B9¢,X¢B6¢,X¢B5¢,X¢E1¢,X¢9D¢)    /* F0-F7 */
 DC AL1(X¢90¢,X¢BD¢,X¢B3¢,X¢DA¢,X¢FA¢,X¢EA¢,X¢3E¢,X¢41¢)    /* F8-FF */
        EJECT ,
*************************************************************************
*       SBCS EBCDIC-to-ASCII translate table                            *
*************************************************************************
        SPACE 1
 SEBCASC   DS    0X
 DC AL1(X¢00¢,X¢01¢,X¢02¢,X¢03¢,X¢DC¢,X¢09¢,X¢C3¢,X¢1C¢)    /* 00-07 */
 DC AL1(X¢CA¢,X¢B2¢,X¢D5¢,X¢0B¢,X¢0C¢,X¢0D¢,X¢0E¢,X¢0F¢)    /* 08-0F */
 DC AL1(X¢10¢,X¢11¢,X¢12¢,X¢13¢,X¢DB¢,X¢DA¢,X¢08¢,X¢C1¢)    /* 10-17 */
 DC AL1(X¢18¢,X¢19¢,X¢C8¢,X¢F2¢,X¢1A¢,X¢1D¢,X¢1E¢,X¢1F¢)    /* 18-1F */
 DC AL1(X¢C4¢,X¢B3¢,X¢C0¢,X¢D9¢,X¢BF¢,X¢0A¢,X¢17¢,X¢1B¢)    /* 20-27 */
 DC AL1(X¢B4¢,X¢C2¢,X¢C5¢,X¢B0¢,X¢B1¢,X¢05¢,X¢06¢,X¢07¢)    /* 28-2F */
 DC AL1(X¢CD¢,X¢BA¢,X¢16¢,X¢BC¢,X¢BB¢,X¢C9¢,X¢CC¢,X¢04¢)    /* 30-37 */
 DC AL1(X¢B9¢,X¢CB¢,X¢CE¢,X¢DF¢,X¢14¢,X¢15¢,X¢FE¢,X¢7F¢)    /* 38-3F */
 DC AL1(X¢20¢,X¢FF¢,X¢83¢,X¢84¢,X¢85¢,X¢A0¢,X¢C6¢,X¢86¢)    /* 40-47 */
 DC AL1(X¢87¢,X¢A4¢,X¢BD¢,X¢2E¢,X¢3C¢,X¢28¢,X¢2B¢,X¢7C¢)    /* 48-4F */
 DC AL1(X¢26¢,X¢82¢,X¢88¢,X¢89¢,X¢8A¢,X¢A1¢,X¢8C¢,X¢8B¢)    /* 50-57 */
 DC AL1(X¢8D¢,X¢E1¢,X¢21¢,X¢24¢,X¢2A¢,X¢29¢,X¢3B¢,X¢AA¢)    /* 58-5F */
 DC AL1(X¢2D¢,X¢2F¢,X¢B6¢,X¢8E¢,X¢B7¢,X¢B5¢,X¢C7¢,X¢8F¢)    /* 60-67 */
 DC AL1(X¢80¢,X¢A5¢,X¢DD¢,X¢2C¢,X¢25¢,X¢5F¢,X¢3E¢,X¢3F¢)    /* 68-6F */
 DC AL1(X¢9B¢,X¢90¢,X¢D2¢,X¢D3¢,X¢D4¢,X¢D6¢,X¢D7¢,X¢D8¢)    /* 70-77 */
 DC AL1(X¢DE¢,X¢60¢,X¢3A¢,X¢23¢,X¢40¢,X¢27¢,X¢3D¢,X¢22¢)    /* 78-7F */
 DC AL1(X¢9D¢,X¢61¢,X¢62¢,X¢63¢,X¢64¢,X¢65¢,X¢66¢,X¢67¢)    /* 80-87 */
 DC AL1(X¢68¢,X¢69¢,X¢AE¢,X¢AF¢,X¢D0¢,X¢EC¢,X¢E7¢,X¢F1¢)    /* 88-8F */
 DC AL1(X¢F8¢,X¢6A¢,X¢6B¢,X¢6C¢,X¢6D¢,X¢6E¢,X¢6F¢,X¢70¢)    /* 90-97 */
 DC AL1(X¢71¢,X¢72¢,X¢A6¢,X¢A7¢,X¢91¢,X¢F7¢,X¢92¢,X¢CF¢)    /* 98-9F */
 DC AL1(X¢E6¢,X¢7E¢,X¢73¢,X¢74¢,X¢75¢,X¢76¢,X¢77¢,X¢78¢)    /* A0-A7 */
 DC AL1(X¢79¢,X¢7A¢,X¢AD¢,X¢A8¢,X¢D1¢,X¢ED¢,X¢E8¢,X¢A9¢)    /* A8-AF */
 DC AL1(X¢5E¢,X¢9C¢,X¢BE¢,X¢FA¢,X¢B8¢,X¢F5¢,X¢F4¢,X¢AC¢)    /* B0-B7 */
 DC AL1(X¢AB¢,X¢F3¢,X¢5B¢,X¢5D¢,X¢EE¢,X¢F9¢,X¢EF¢,X¢9E¢)    /* B8-BF */
 DC AL1(X¢7B¢,X¢41¢,X¢42¢,X¢43¢,X¢44¢,X¢45¢,X¢46¢,X¢47¢)    /* C0-C7 */
 DC AL1(X¢48¢,X¢49¢,X¢F0¢,X¢93¢,X¢94¢,X¢95¢,X¢A2¢,X¢E4¢)    /* C8-CF */
 DC AL1(X¢7D¢,X¢4A¢,X¢4B¢,X¢4C¢,X¢4D¢,X¢4E¢,X¢4F¢,X¢50¢)    /* D0-D7 */
 DC AL1(X¢51¢,X¢52¢,X¢FB¢,X¢96¢,X¢81¢,X¢97¢,X¢A3¢,X¢98¢)    /* D8-DF */
 DC AL1(X¢5C¢,X¢F6¢,X¢53¢,X¢54¢,X¢55¢,X¢56¢,X¢57¢, X¢41¢ )  /* E0-E7 */
 DC AL1(X¢59¢,X¢5A¢,X¢FD¢,X¢E2¢,X¢99¢,X¢E3¢,X¢E0¢,X¢E5¢)    /* E8-EF */
 DC AL1(X¢30¢,X¢31¢,X¢32¢,X¢33¢,X¢34¢,X¢35¢,X¢36¢,X¢37¢)    /* F0-F7 */
 DC AL1(X¢38¢,X¢39¢,X¢FC¢,X¢EA¢,X¢9A¢,X¢EB¢,X¢E9¢,X¢9F¢)    /* F8-FF */
        EJECT ,
*************************************************************************
*       DBCS ASCII-to-EBCDIC translate table                            *
*************************************************************************
```

Figure 85 (Part 5 of 6). Sample Translate Table with Changes

```
         SPACE 1
DASCEBC  DC    X¢00¢                    No DBCS ASCII table
         SPACE 1
*        ****************************************************************
*        *  DBCS ASCII translation ranges                                *
*        ****************************************************************
         SPACE 1
DBCSRNGS DC    X¢00¢,X¢00¢              No DBCS ASCII ranges
         DC    X¢00¢,X¢00¢
         DC    X¢00¢,X¢00¢
         DC    X¢00¢,X¢00¢
         EJECT ,
*************************************************************************
*       DBCS EBCDIC-to-ASCII translate table                            *
*************************************************************************
         SPACE 1
DEBCASC  DC    X¢00¢                    No DBCS EBCDIC table
         SPACE 1
         END   XLATVTBL
```

Figure 85 (Part 6 of 6). Sample Translate Table with Changes

Notes:

- Changes are only done in the actual translate table parts, that is, the parts which are preceded with comment lines ′SBCS ASCII-to-EBCDIC translate table′, entry **SASCEBC** and ′SBCS EBCDIC-to-ASCII translate table′, entry **SEBCASC**.
- Check in *ESA/370 Reference Summary, GX20-0406* for the hexadecimal value of an ASCII ′A′ (X′41′) and EBCDIC ′X′ (X′E7′).
- We changed in entry SASCEBC the original EBCDIC value for ′A′ (X′C1′) to the new value ′X′ (′E7′), see marked position.
- In the same way we changed in entry SEBCASC the original value for ASCII ′X′ (X′58′) to ASCII ′A′ (X′41′), see marked position.

9.4 Compile and Link the Translate Table

Since we punched book EWXENG2.Z to ICCF we used the VSE/ESA Interactive Interface compile option to create the corresponding compile and link job for the changed translate table, see Figure 86.

```
* $$ JOB JNM=EWXENGXJ,DISP=D,CLASS=A,NTFY=YES
* $$ LST DISP=D,CLASS=Q,PRI=3
// JOB EWXENGXJ COMPILE PROGRAM EWXENGX
// SETPARM CATALOG=1
// IF CATALOG = 2 THEN
// GOTO NOCAT
// LIBDEF PHASE,CATALOG=PRD2.LANRES
// OPTION ERRS,SXREF,SYM,NODECK,CATAL
   PHASE EWXENGX,*
// GOTO ENDCAT
/. NOCAT
// OPTION ERRS,SXREF,SYM,LIST,NODECK
/. ENDCAT
// EXEC ASMA90,SIZE=(ASMA90,64K),PARM=¢EXIT(LIBEXIT(EDECKXIT)),SIZE(MAXC
                -200K,ABOVE)¢
* $$ SLI ICCF=(EWXENGX),LIB=(0020)
/*
// IF CATALOG EQ 2 OR $MRC GT 4 THEN
// GOTO NOLNK
// EXEC LNKEDT,SIZE=256K
/. NOLNK
/&
* $$ EOJ
```

Figure 86. Compile and Link Sample Translate Table

9.5 Include Changed Translate Table in EXWCOMM.INI

Now you must include your updated translate table in the EWXCOMM.INI file at the VSE host. Figure 87 shows our new EWXCOMM.INI and the job to catalog it into our LANRES library.

```
* $$ JOB JNM=EWXCOMM,CLASS=C,DISP=D
// JOB EWXCOMM
// EXEC LIBR,PARM=¢MSHP¢
ACC S=PRD2.LANAPPL
CATALOG EWXCOMM.INI    R=Y
*--------------------------------------------------------------------*
*  Configuration options for the LANRES/VSE platform                 *
*                                                                    *
*  - Comment lines begin with ¢*¢, ¢/¢, or ¢;¢.                      *
*  - Blank lines are ignored.                                        *
*  - The maximum record length is 80.  Lines longer than 80 will be  *
*    truncated.                                                      *
*  - The configuration options are not case sensitive.               *
*--------------------------------------------------------------------*
*  Default mode name for APPC conversations
Default_Mode_Name = #INTER
*  ASCII/EBCDIC translate table name
*    EWXLATE  - Default LANRES/VM translate table
*    EWXENG1  - US English 437
*    EWXENG2  - US English 850
*    EWXGER1  - Austria/Germany 437
*    EWXGER2  - Austria/Germany 850
*    EWXITL1  - Italy 437
*    EWXITL2  - Italy 850
*    EWXSPN1  - Spain/Latin America 437
*    EWXSPN2  - Spain/Latin America 850
*    EWXUK1   - United Kingdom 437
*    EWXUK2   - United Kingdom 850
*    EWXFRC1  - France 437
*    EWXFRC2  - France 850
*    EWXJAPAN - Japanese DBCS 301
*    EWXKOREA - Korean DBCS 926
*    EWXCHINA - Traditional Chinese DBCS 927
TRANSLATE_TABLE = EWXENGX
/+
/*
/&
* $$ EOJ
```

Figure 87. EWXCOMM.INI with New Translate Table Entry

Note: The translate table phasename specified at the bottom of EWXCOMM.INI must match, of course, the phasename used in the compile and link job in Figure 86 on page 118.

9.6 Using the Changed Translate Table

We tried out the changes by creating small files on the VSE host and the OS/2 server containing letters ′A′ and ′X′ which we ′exchanged′ by the translate table changes described in the previous chapter.

Then we verified the translation changes by transferring some files from the host to the server and vice versa using the LANRES/VSE Distribution and Administration function.

Note

We found out, that the translate table changes we made, even affect the LANRES messages on both sides.

Appendix A. ACF/VTAM Startup Book ATCSTR01.B.

This is the ACF/VTAM book **ATCSTR01.B** we used for starting up ACF/VTAM V4.2 in VSE/ESA.

```
CATALOG ATCSTR01.B                    REPLACE=YES                C
SSCPID=1,                                                        C
SSCPNAME=SSCP01,                                                 C
NETID=VTAM1,                                                     C
HOSTSA=1,                                                        C
HOSTPU=NODE01,                                                   C
MAXSUBA=255,                                                     C
CONFIG=01,                                                       C
NOPROMPT,                                                        C
IOINT=0,                                                         C
SGALIMIT=0,                                                      C
BSBUF=(28,,,,1),                                                 C
CRPLBUF=(60,,,,1),                                               C
LFBUF=(70,,,,11),                                                C
IOBUF=(70,288,,,11),                                             C
LPBUF=(12,,,,6),                                                 C
SFBUF=(20,,,,20),                                                C
SPBUF=(210,,,,32),                                               C
XDBUF=(6,,,,1)
/+
/*
```

Figure 88. ACF/VTAM Startup Book ATCSTR01.B

Appendix B. Setup for the APPC Connection via IBM 3174

Prerequisites when using the IBM 3174 as APPC gateway for LANRES/VSE:

- The IBM 3174 has to be at the latest level of the 3174 CONFIG 'C' micro-code
- The APPN feature of CONFIG 'C' is required
- In the VTAM book (VBUILD TYPE=LOCAL), all LU definitions with a LOCADDR=0 must **immediately** follow the **first** PU definition.

B.1.1.1 VTAM Definitions for the IBM 3174 Gateway

This is a sample VTAM VBUILD TYPE=LOCAL definition for the IBM 3174 APPC gateway that supports an OS/2 LANRES server at address 622:

```
* $$ JOB JNM=VTM3174,CLASS=C,DISP=D
// JOB VTM3174     CATALOG VTM3174.B for APPC through IBM 3174
// EXEC LIBR,PARM=¢MSHP¢
ACC S=PRD2.CONFIG
CATALOG VTM3174.B R=Y
*
VTM3174  VBUILD TYPE=LOCAL
COAX3174 PU     CUADDR=620,PUTYPE=2,XID=YES,DYNLU=YES,                C
                ISTATUS=ACTIVE,MAXBFRU=8
* ===== OS2SER IS THE ILU FOR THE OS2 LANRES SERVER ========
OS2SER   LU     LOCADDR=0,                                            C
                MODETAB=IESINCLM,                                     C
                DLOGMOD=#INTER
* ===== COAX PORTS ========================================
C0262001 LU     LOCADDR=2,                                            C
                DLOGMOD=SP327002S,                                    C
                MODETAB=IESINCLM,                                     C
                USSTAB=VTMUSSTR,                                      C
                MDLTAB=VTMMDL,                                        C
                MDLENT=VSELU2A,                                       C
                ISTATUS=ACTIVE,SSCPFM=USSSCS
C0262002 LU     LOCADDR=3,                                            C
                DLOGMOD=SP327002S,                                    C
                MODETAB=IESINCLM,                                     C
                USSTAB=VTMUSSTR,                                      C
                MDLTAB=VTMMDL,                                        C
                MDLENT=VSELU2A,                                       C
                ISTATUS=ACTIVE,SSCPFM=USSSCS
* ===== OS2 LANRES SERVER ================================
LR4OS2   PU     CUADDR=622,PUTYPE=2,SECNET=YES,                       C
                CPNAME=OS2NAME,DYNLU=YES,                             C
                ISTATUS=ACTIVE,MAXBUFRU=8
/+
/*
/&
* $$ EOJ
```

Figure 89. VTAM Book for the IBM 3174 Gateway

Note: Make sure that the definitions for the LUs with LOCADDR=0 immediately follow the first PU definition.
This is why in our example, the LU definition OS2SER has to be right below the COAX3174 PU definition.

B.1.1.2 Tailoring the IBM 3174

This is a sample APPN node definition of the IBM 3174. It has been specified in the IBM 3174 configure control disk main menu, selection 6: *DEFINE APPN Node*

```
-------------- Network Resources --------------------------

  CPNAME   NODE  TYPE  LUs  DLC TYPE     ADDRESS      DLCI

1 OS2NAME    4     X    1   4000 0C9C 0002 04
2
-----------------------------------------------------------


--------- Network Resource Qualifiers ----------------------

  CPNAME    NETID   PUNAME
  =======   =====   ======
1 OS2NAME   VTAM1   LR4OS2
2
-----------------------------------------------------------


--------- Associated LUs -----------------------------------

  CPNAME    LUNAME  LUNAME  LUNAME  LUNAME  SERVING NN

1 OS2NAME   OS2SER
2
-----------------------------------------------------------
```

Figure 90. IBM 3174 APPN Configuration

Appendix C. APPC Communication with a PC Server System/390

In another demonstration environment (different to the ITSO Böblingen LANRES/VSE environment as described in 1.3, “The ITSO Böblingen LANRES/VSE Client/Server Environment” on page 5), we had a PC Server System/390 with VSE/ESA including LANRES/VSE running on the P/390 card as the LANRES host system. The OS/2 part of LANRES was installed on a separate PC running OS/2 Warp and the Communications Manager/2 for the APPC connection. These two systems were connected via an IBM Token-Ring local area network (LAN).

Figure 91 illustrates this LANRES/VSE environment:

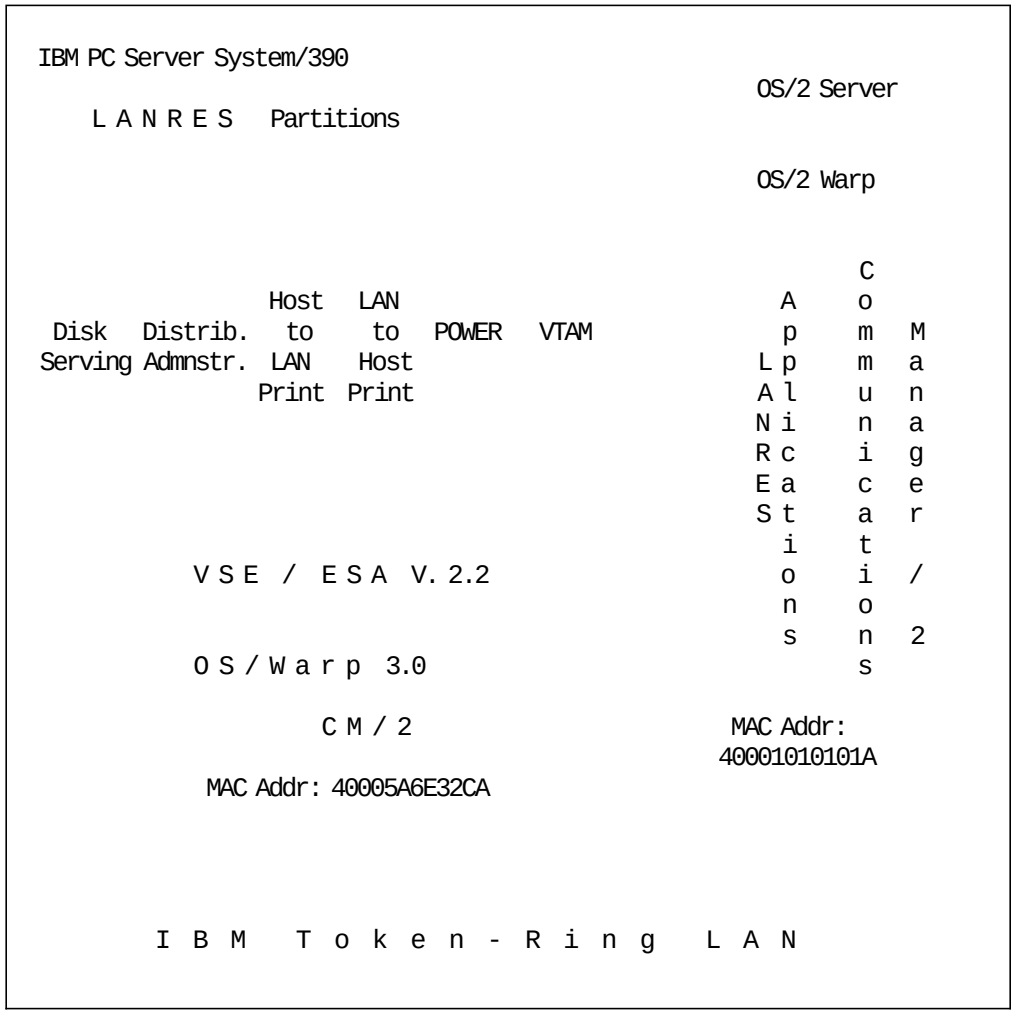

Figure 91. The Demo LANRES/VSE Environment

Note

If you want to install both, the VSE and the OS/2 part of LANRES on the same physical machine and thereby make use of the internally emulated channel communication, please refer to *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support), SC33-6624 Chapter 4: PC Server System/390 Configuration*

We used the PC Server System/390 as our LANRES/VSE host system that had an APPC connection via the Token-Ring LAN to the OS/2 server where the LANRES OS/2 code was installed. For a VTAM APPC connection, the PC Server System/390 emulates an IBM 3172. This can be easily configured with the IBM P/390 Configurator on the PC Server System/390. We added in the P390's Update System Device menu a device with the Mgr. Code 9=AWS3172 as CUADDR 960.

Once the emulated IBM 3172 is defined to the VSE/ESA system running on the PC Server System/390, the SNA LU 6.2 configurations for the LANRES APPC communication are almost identical to the definitions for a real IBM 3172 as described in 3.2.2, "APPC Connection Using IBM 3172" on page 27. In the following, you will find some sample definitions of our demo setup to define an APPC connection via the emulated IBM 3172.

C.1.1.1 Customize VSE/ESA IPL Procedure

We added the following ADD statement to the VSE/ESA IPL procedure to make the emulated IBM 3172 accessible from our VSE/ESA:

```
      .
      .
ADD 960,CTCA,EML          Emulated IBM 3172
      .
      .
      .
```

Figure 92. IPL Procedure Definition for the Emulated IBM 3172

C.1.1.2 Define the VTAM XCA Major Node for the IBM 3172

The following figure shows a sample VTAM XCA Major Node definition for the LANRES APPC connection via the emulated IBM 3172.

```
* $$ JOB JNM=P390XCA,CLASS=C,DISP=D
// JOB P390XCA    CATALOG P390XCA.B for IBM 3172 at CUADDR 960
// EXEC LIBR,PARM=¢MSHP¢
ACC S=PRD2.CONFIG
CATALOG P390XCA.B R=Y
*
P390XCA  VBUILD TYPE=XCA
*
* Definition for the emulated IBM 3172
* ------------------------------------------------
* (Use SAPADDR=8 since SAPADDR=4 is already occupied
*  by the OS/2 Communications Manager/2)
*
*
P393172  PORT  CUADDR=960,                                          C
               MEDIUM=RING,                                         C
               ADAPNO=0,                                            C
               SAPADDR=8,                                           C
               TIMER=60
G3172    GROUP DIAL=YES,CALL=INOUT,ISTATUS=ACTIVE,ANSWER=ON
L31701   LINE
P390PU   PU
/+
/*
/&
* $$ EOJ
```

Figure 93. VTAM XCA Major Node Definition for APPC Connection via IBM 3172

Notes:

CUADDR=960 Specifies the logical attachment of the emulated IBM 3172 (as specified in the IPL procedure).

SAPADDR=8 The emulated IBM 3172 uses the SAPADDR 08 of the Token-Ring adapter of the PC Server System/390 since the default SAPADDR 04 is already used by the Communications Manager/2 that runs on this system using the same Token-Ring adapter.

C.1.1.3 VTAM SWNET Major Node for the APPC Connection

The following figure shows a sample VTAM SWNET Major Node definition on the PC Server System/390 for the LANRES APPC connection via the emulated IBM 3172.

```
* $$ JOB JNM=IBM3172,CLASS=C,DISP=D
// JOB VTMSWLRS                CATALOG VTMSWLRS.B
// EXEC LIBR,PARM=¢MSHP¢
ACCESS SUBLIB=PRD2.CONFIG
CATALOG VTMSWLRS.B                REPLACE=YES
*  VTAM book for LANRES SWitched NETwork resources
VTMSWLRS VBUILD TYPE=SWNET,MAXGRP=20,MAXNO=20
OS2PU2   PU    ADDR=04,                                              C
               LANSW=YES,                                            C
               LANSDWDW=(1,),                                        C
               CPNAME=OS2LU2,                                        C
               IDBLK=05D,                                            C
               IDNUM=E0001,                                          C
               PUTYPE=2,                                             C
               MAXDATA=256,                                          C
               MAXOUT=1,                                             C
               MAXPATH=1,                                            C
               DISCNT=NO,                                            C
               ANS=CONTINUE,                                         C
               ISTATUS=ACTIVE,PACING=2,VPACING=1,                    C
               SAPADDR=4
*
* DIALNO=aabbccccccccccc
* where aa is meaningless 2 digit placeholder
*       bb is the value of the SAPADDR definition
*       bb is the value of the SAPADDR definition
*   cc..cc is the media access control (MAC) address
*          of the LANRES PS/2 (cc..cc has got length 12)
*
PATHOS2  PATH  DIALNO=0104400010101O1A,                              C
               GRPNM=G3172
*
* This is for the APPC session with the LANRES PS/2
OS2LU2   LU    LOCADDR=0,DLOGMOD=#INTER,                             C
               ISTATUS=ACTIVE,MODETAB=IESINCLM
*
* This is for 3270 terminal emulation sessions
P390LU2  LU    LOCADDR=02,DLOGMOD=SP3272QS,                          C
               ISTATUS=ACTIVE,MODETAB=IESINCLM,                      C
               USSTAB=VTMUSSTR
*
P390LU3  LU    LOCADDR=03,DLOGMOD=SP3272QS,                          C
               ISTATUS=ACTIVE,MODETAB=IESINCLM,                      C
               USSTAB=VTMUSSTR
 /+
 /*
 /&
* $$ EOJ
```

Figure 94. VTAM SWNET Major Node for LANRES APPC Connection

Notes:

CPNAME=OS2LU2
Specifies the CPNAME we used and must match the *Local node name* in the Communications Manager/2 profile definition on the LANRES OS/2 server as shown in Figure 27 on page 41.

SAPADDR=4 On the OS/2 server, we used default address ′4′.

40001010101A This is the MAC address of the Token-Ring adapter of our OS/2 server (see Figure 91 on page 125).

LOCADDR=0 For the APPC connection the LOCADDR must always be set to ′0′.

C.1.1.4 VTAM Application Major Node Definition

For our demo environment, we used the VTAM application major node definition LRSAPPL as already shown in Figure 19 on page 31

C.1.1.5 OS/2 Server Communications Manager/2 Setup

For the OS/2 server in our demo environment, we used exactly the same Communications Manager/2 setup as we described in 4.2.2.1, “Customize Communications Manager/2 on the OS/2 Server for APPC” on page 40. There were only two exceptions in the *Connection to a Host* configuration window where we had to specify different values:

1. *LAN destination address (hex)* **40005A6E32CA**. This is the MAC address of the Token-Ring adapter of the PC Server System/390 (see Figure 91 on page 125).
2. *Remote SAP (hex)* **08**. This is the SAP address used by the emulated IBM 3172 on the PC Server System/390 (see Figure 93 on page 127).

Appendix D. Special Notices

This publication is intended to help system engineers, marketing representatives and customers to integrate OS/2 LANs into S/390 VSE/ESA systems using LANRES/VSE as disk, distribution, administration and printing server.

The document describes how to install and customize the LANRES/VSE server on VSE/ESA and the corresponding LANRES components on the OS/2 server. In addition detailed instructions are provided how to connect the LANRES/VSE host and OS/2 server with each other using several connectivity options.

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Appendix E. Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

E.1 International Technical Support Organization Publications

For information on ordering these ITSO publications see “How to Get ITSO Redbooks” on page 135.

- *LANRES/VSE: Integrating Novell LANs into S/390 VSE System*, SG24-4561

E.2 Redbooks on CD-ROMs

Redbooks are also available on CD-ROMs. **Order a subscription** and receive updates 2-4 times a year at significant savings.

CD-ROM Title	Subscription Number	Collection Kit Number
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Application Development Redbooks Collection	SBOF-7290	SK2T-8037
Personal Systems Redbooks Collection	SBOF-7250	SK2T-8042

E.3 Other Publications

These publications are also relevant as further information sources.

LANRES/VSE Publications

- *LAN Resource Extension and Services/VSE Guide and Reference (OS/2 Support)*, SC33-6624

OS/2 Server Publications

- *OS/2 Warp Server Up and Running*, S25H-8004
- *OS/2 Warp Server Easy Start*, S25H-8003

VSE/ESA Publications

- *VSE/ESA Installation, Version 2 Release 1*, SC33-6604
- *VSE/ESA Administration, Version 2 Release 1*, SC33-6605
- *VSE/ESA System Control Statements, Version 2 Release 1*, SC33-6613
- *VSE/ESA General Information Planning Aspects, Version 2 Release 1*, GC33-6628
- *VSE/POWER Administration and Operation*, SC33-6633
- *VSE/POWER Diagnosis Reference*, LY33-9163
- *VTAM Messages and Codes*, SC31-6433

- *VTAM Operation*, SC31-6435
- *VTAM Resource Definition Reference*, SC31-6438
- *VTAM Network Implementation Guide*, SC31-6434
- *SNA Network Product Formats*, LY43-0081

Other IBM Publications

- *ESA/370 Reference Summary*, GX20-0406
- *IBM PS/2 MicroChannel to Mainframe Connection, Hardware Maintenance Library*, G571-0239

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  TOOLS SENDTO CANVM2 TOOLS REDPRINT GET SG24xxxx PACKAGE (Canadian users only)
  ```

  To get BookManager BOOKs of redbooks, type the following command:

  ```
  TOOLCAT REDBOOKS
  ```

  To get lists of redbooks:

  ```
  TOOLS SENDTO USDIST MKTTOOLS MKTTOOLS GET ITSOCAT TXT
  TOOLS SENDTO USDIST MKTTOOLS MKTTOOLS GET LISTSERV PACKAGE
  ```

  To register for information on workshops, residencies, and redbooks:

  ```
  TOOLS SENDTO WTSCPOK TOOLS ZDISK GET ITSOREGI 1996
  ```

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  ```
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List of Abbreviations

ACF	Advanced Communication Function
AFP	Advanced Function Printer
ANSI	American National Standards Institute
API	Application Programming Interface
APPC	Advanced Program to Program Communications
APPL	Application Program
APPN	Advanced Peer-to-Peer Networking
ASA	American Standards Association
ASCII	American National Standard for Information Interchange
CD-ROM	Compact Disc-Read Only Memory
CETI	Continuously Executing Transfer Interface
CICS	Customer Information Control System
CM/2	Communications Manager/2
CMS	Conversational Monitor System
CTCA	Channel to Channel Adapter
DASD	Direct Access Storage Device
DBCS	Double Byte Character Set
DITTO	Data Interfile Transfer, Testing, and Operations
DLC	Data Link Control
DOS	Disk Operating System
EBCDIC	Extended Binary-Coded Decimal Interchange Code
ECKD	Extended Control Key Data
ESA	Enterprise System Architecture
ESCON	Enterprise System CONnection
GUI	Graphical User Interface
IBM	International Business Machines Corporation
ICA	Integrated Communication Adapter
ICCF	Interactive Computing and Control Facility
ICP	Interconnect Control Program
IEEE	Institute of Electrical and Electronics Engineers
IEF	Information Engineering Facility
IOCDS	Input/Output Configuration Data Set
IPL	Initial Program Load
ITSO	International Technical Support Organization
JCL	Job Control Language
LAN	Local Area Network
LANRES	Local Area Network Resource Extension and Services
LU	Logical Unit
MAC	Medium Access Control
MMC	Microchannel to Mainframe Connection
NCP	Network Control Program
NLM	NetWare Loadable Modules
OS/2	Operating System/2
PC	Personal Computer
POWER	Peripheral Output Writers Execution Readers
PU	Physical Unit
REXX	REstructured eXtended eXecutor
RMODE	Residency Mode
RRDS	Relative Record Data Set
RU	Request/response Unit
S/2	IBM System/2
S/370	IBM System/370
S/390	IBM System/390
SAA	System Application Architecture
SAP	Service Access Point
SBCS	Single Byte Character Set
SCSI	Small Computer System Interface
SDLC	Synchronous Data Link Control
SNA	System Network Architecture
SVA	Shared Virtual Area
VM	Virtual Machine

VSAM	Virtual Storage Access Method
VSE	Virtual Storage Extended
VTAM	Virtual Telecommunication Access Method
WARP	Workstation Asset Reduction Program
XCA	eXternal Communication Adapter

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Special Characters

Numerics

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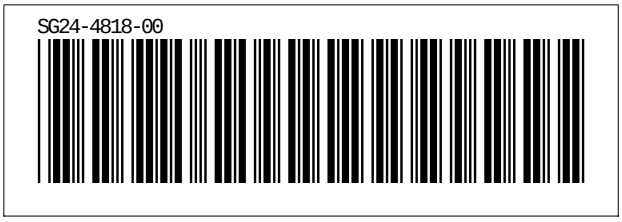

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Document style	REDBOOK
Profile	EDFPRF30
Service Level	0029
SCRIPT/VS Release	4.0.0
Date	97.05.27
Time	04:25:04
Device	3820A
Number of Passes	4
Index	YES
SYSVAR D	YES
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Formatting values used:

Annotation	NO
Cross reference listing	YES
Cross reference head prefix only	NO
Dialog	LABEL
Duplex	YES
DVCF conditions file	(none)
DVCF value 1	(none)
DVCF value 2	(none)
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Figure/table number separation	YES
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